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No. VIII., OF VOL. I., 1938. LONDON, SATURDAY, FEBRUARY 19, 1938. Pp. 128—Price 1s.
No. 5973. VOL. CCXXXIV Founded 1823. PUBLISHED WEEKLY. Registered as a Newspaper. Annual Subscription: Inland £2 2s. Abroad £2 10s.

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No. 5973 LONDON: SATURDAY, FEBRUARY 19, 1938 CCXXXIV

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

Pulmonary Tuberculosis: Relation of Childhood Infection to the Disease in Adults. By Prof. A. WALLGREN, M.D..... 417
The Gastric Lesion in Pernicious Anæmia. By H. A. MAGNUS, M.D., and C. C. UNGLEY, F.R.C.P. (*illus. plate*)..... 420
Alcoholic Labyrinthine Injection through the Oval Window in the Treatment of Aural Vertigo. By R. PEACOCK, F.R.C.S. (*illus. on plate*) 421
Arteritis of the Temporal Vessels. By G. H. JENNINGS, M.R.C.P. (*illus. on plate*)..... 424
Leiomyoma of the Stomach. By B. R. SWORN, F.R.C.S., and T. V. COOPER, M.B. (*illus. on plate*)..... 428
Surgical Treatment of Bell's Palsy. By W. M. MORRIS, F.R.C.S. (*illus.*)..... 429
The Action of Curarine on Respiration. By R. WEST, M.D..... 432

CLINICAL AND LABORATORY NOTES

Chronic Duodenal Ulcer in a Child of Six Years. By R. W. JOHN, M.R.C.S.... 433
Post-partum Macrocytic Anæmia associated with Confusional States. By I. ATKIN, M.D..... 434
Evipan Sodium in the Treatment of Tetanus. By K. V. EARLE, M.D... 435

MEDICAL SOCIETIES

Royal Society of Medicine: Section of Therapeutics and Pharmacology: Sex Hormones in the Urine.. 435
Association of Clinical Pathologists: Blood Fragility Tests—Level of Plasma Bilirubin..... 436
Medical Society of London: Deep X Ray Therapy.... 438
Cardiff Medical Society: Return to Work of the Injured Colliery Workman..... 440

REVIEWS AND NOTICES OF BOOKS

La chirurgie de la douleur. By Prof. R. Leriche..... 441
Neuro-Ophthalmology. By R. L. Rea, F.R.C.S..... 441
A Manual of Operating Room Procedures. By A. W. Hoppe and L. M. Halverson..... 441
Frequency Curves and Correlation. By W. P. Elderton, F.I.A. 442
A Textbook of Gymnastics. By K. A. Knudsen 442
Quarterly Journal of Medicine 442

LEADING ARTICLES

THE CROYDON EPIDEMIC .. 443
THE STOMACH AND PERNICIOUS ANÆMIA 443
FOOD AND THE GROWING FAMILY 444
EXOPHTHALMOS AND THE PITUITARY 445

ANNOTATIONS

A Blue Sarcophagus..... 446
A Delinquency Clinic..... 446
A Fraternal Mission..... 447
Caves in Palestine..... 447
Radiography of the Urethra 448
Venous Thrombosis as a Sign of Visceral Cancer.. 448
Excretion of Sex Hormones in Urine..... 448
An International Pharmacopœia 449
Treatment of Aural Vertigo 449
Fertility and Intelligence.. 450
Heart Failure after Pulmonary Embolism 450

PANEL AND CONTRACT PRACTICE

The February Health Campaign 458

GRAINS AND SCRUPLES

From a Hospital Physician (III)..... 458

SPECIAL ARTICLES

Psychoneurosis in Hospital Practice. By R. S. BRUCE PEARSON, M.R.C.P..... 451
Medicine and the Law: Aphasia and Testamentary Capacity..... 456
Ireland: Conditions in the Dispensary Medical Service 456
Hospital Conversations in London 457
Report of the Croydon Typhoid Inquiry: Source of Infection—The Work in the Well—Health of the Workmen—Steps Taken to Deal with the Outbreak 468

THE LANCET 100 Years Ago 467

CORRESPONDENCE

Dispensing by Doctors ... 460
Dysentery and Metadysentery Bacilli (Count Aldo Castellani, F.R.C.P.) ... 461
Prognosis of Schizophrenia (Drs. E. Larkin and H. Gillies)..... 461
Contraception and Fertility (Dr. G. H. Alabaster, F.R.C.S.E., Mr. V. B. Green-Armytage, F.R.C.S.) 462
A "Latin Tag" (Mr. E. Watson-Williams, F.R.C.S.) 463
Grains and Scruples (Miss E. V. Smylie)..... 463
Can Death Caused by Injuries Received in a Motor Accident be Instantaneous? (Sir Norman Macleod)..... 463
Dundee and Elsewhere.... 464
The Harley-street Purge.. 464

PARLIAMENT

Notes on Current Topics.. 471
Question Time: Physical Training—Smoke Abatement—Physique of Naval Recruits—The Sale of Poisons—Dairy Research and Nutrition—Public Health Services on Tyneside 471

OBITUARY

Sir Truby King, M.B. (*with portrait*)..... 465
Sir Josiah Court, M.R.C.S. (*with portrait*) 466
Charles Parker Stewart, M.B. 466

PUBLIC HEALTH

The Maternity Problem of a Smaller Town—Vital Statistics of 1935..... 466
Infectious Disease in England and Wales 467

MEDICAL NEWS

University of Oxford 474
University of London 474
University of Sheffield 474
Hospital Almoners' Assoc. 474
Royal College of Surgeons of England 474
Health of Busmen..... 474
International Leprosy Conference 474
Hunterian Society..... 475
Institute of Psycho-Analysis 475
Course in Psychological Medicine 475
Grenfell Association 475
Coördination of Newcastle Hospitals 475
Lord Horder on Ray Treatment 457
Cremation Conferences... 476
National Assoc. for Prevention of Tuberculosis. 478
Work of Dental Mechanics 478
The Shortage of Nurses.... 478

NOTES, COMMENTS, AND ABSTRACTS

An Eighteenth Century Diary!..... 477
A Boot for Use with Plaster-of-Paris (*illus.*) . 477
A New and a Changed Contemporary 477
Meningo-encephalitis after Rubella 478
Swedish Experience of Zinc Insulin and Zinc Protamine Insulin..... 478
Films of South Africa..... 478
Vitamin-C Output in Diet Treatment of Rheumatoid Arthritis 478

Appointments 473
Births, Marriages, Deaths 473
Medical Diary 475
Vacancies 476

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PULMONARY TUBERCULOSIS

RELATION OF CHILDHOOD INFECTION TO THE DISEASE IN ADULTS *

By Arvid Wallgren, M.D.

SENIOR PHYSICIAN TO THE CHILDREN'S HOSPITAL, GOTHENBURG

After having made the diagnosis of a fresh tuberculous infection in a child, we proceed inter alia to consider the prognosis. This is of greatest importance to the parents. It is our duty, therefore, to try to answer their anxious question: "What is going to happen to our child now and in the future?"

In regard to the risk of a tuberculous infection, the child has, broadly speaking, to pass through two essentially different danger periods. The first is directly connected with the primary infection, the second appears much later in adult years. During the first danger period, which is brief and usually lasts but a few months, the child is threatened by miliary tuberculosis or tuberculous meningitis. During the second period, which does not begin before puberty and usually lasts for two or three decades, the infected individual may become prey to the adult type of pulmonary tuberculosis. Between these two periods he usually passes through a quiescent interval, which is longer the younger the child when infected.

The First Danger Period

In spite of the most favourable conditions for the early diagnosis and appropriate treatment of primary tuberculosis, a certain number of children succumb during the first stage. Thus among 453 infants and children up to the age of 16 years, who had been under observation and treatment from the onset of the primary tuberculosis, 35 (7·7 per cent.) died within the first few months.

The extent of the risk that a tuberculous child runs, however, is not equally great in all children. In some of them we reckon in advance with a considerable risk, while in others it is minimal. The deciding factor is the age—the younger the child the worse the prognosis. Most deaths occur during the first three years. The following is the mortality-rate of the above-mentioned 453 children arranged according to different age-groups :

Age-groups ..	*0–1*	*–3*	*–7*	*–16*	Total.
Number of children	39	64	225	125	453
Mortality-rate (%)	35·9	15·6	4·4	0·8	7·7

The main causes of death were miliary tuberculosis and tuberculous meningitis. It is well known that these disease entities can occur at any time during tuberculosis. They display, however, a marked predisposition to appear close upon the first manifestation of the primary infection. The interval between this event and the occurrence of tuberculous meningitis is as follows :

	Weeks.				Months.							Total.
Interval ..	*1*	*2*	*3*	*4*	*1–2*	*–3*	*–4*	*–5*	*–6*	*–7*	*–13*	
Cases ..	0	3	0	12	25	12	4	2	3	2	1	64

From this it appears that most cases of tuberculous meningitis occur 1–2 months after the first manifestation of primary tuberculosis. Tuberculous meningitis seldom occurs later than 3 months after the primary infection has manifested itself. The rarity of this complication occurring at a later date gives us little cause to reckon with its occurrence, and this is also true of miliary tuberculosis. We may, therefore, conclude that the first three months after the onset of primary tuberculosis is the first danger period, since children under 3 years of age are essentially threatened by a fatal attack of tuberculous disease during this period.

Tuberculous meningitis and miliary tuberculosis result when the tubercle bacillus enters the blood stream. Their occurrence principally during the first few months after manifestation of the tuberculous infection indicates that blood-stream infection is fairly common at this stage of tuberculosis. Experimental evidence on animals supports this opinion, inasmuch as bacillæmia is more or less constantly occurring during the earliest stages after the infection. A hæmatogenous spread of bacilli may also occur later, but never with the frequency observed shortly after the manifestation of the primary infection. Observations on man confirm the quasi-constant hæmatogenous bacillary spread during the primary stage and its rarity during later stages of tuberculosis.

A hæmatogenous spread of tubercle bacilli need not necessarily be associated with miliary tuberculosis. The occurrence of miliary tuberculosis depends largely on the child's resistance and reaction towards the infection. Most people do not react noticeably to a hæmatogenous spread, and there are usually no clinical manifestations. The tubercle bacilli produce, however, multiple and microscopic foci or deposits of bacilli, which may be found anywhere in the organism. If this conception is correct, we may always expect a pulmonary tuberculous condition, irrespective of the site of the primary focus. These foci are a constant threat, since they may be starting-points for new tuberculous lesions, and pulmonary tuberculosis may arise from them when the subject reaches the second danger period.

The Disease in the Adult

Pulmonary tuberculosis of adult type only rarely occurs before puberty, but then its incidence increases. The following is the distribution of 403 cases of pulmonary tuberculosis of adult type on different age-groups :

Age-groups	*0–5*	*–10*	*–15*	*–20*	*–25*	*–30*	*–35*	*–40*	*–45*	*–50*	*–55*
No. of cases..	0	2	22	118	108	66	36	23	19	5	4

It is not before the age of 45–50 that the incidence of consumption decreases. It is seen that the years between 10–15 and 45 constitute the second danger period of tuberculosis.

Immunity

When an adult infected during childhood acquires pulmonary tuberculosis, the question arises as to the connexion between the childhood infection and the pulmonary tuberculosis. The disease cannot develop as a direct and immediate consequence of the primary infection, which differs essentially from the ordinary adult phthisis whose course presupposes that the lung tissue reacts to the tubercle bacilli in a manner different from what it does in a previously uninfected individual. This altered mode of reactivity toward the tubercle bacillus is brought about by the first infection, which is prerequisite for the development of this type of pulmonary tuberculosis.

Some authors believe that pulmonary tuberculosis of adult type requires two different infections : a

* Ingleby lectures for 1937 delivered at the University of Birmingham.

primary infection that produces allergy in the lung parenchyma, and a reinfection of the lung with tubercle bacilli. The condition is, therefore, often called the reinfection type. Reinfection was formerly thought to be endogenous in origin, from some previous focus in the body. More recently, however, it is the exogenous inhalation of new tubercle bacilli that is thought to initiate the disease, and this superinfection is considered to be very dangerous because of the possible subsequent development of pulmonary tuberculosis. The logical consequence of this opinion has been that, in certain quarters, emphasis has been placed on the importance of preventing superinfections in the prophylaxis of adult phthisis. In support of this view the well-known fact is often quoted that the disease is sometimes familial; it is supposed that the greater risk of superinfection in such families is directly responsible for the greater incidence.

This supposition is opposed to the existence of a specific antituberculous immunity, which under ordinary circumstances is great enough to protect against new exogenous infections. If tuberculin-positive and tuberculin-negative groups of children are simultaneously exposed to tuberculous infection, it is observed that the inhalation of tubercle bacilli in the former has no deleterious effect, while the latter must pass through the first danger period, mentioned above, during which some of them may die from miliary tuberculosis or tuberculous meningitis. In such a situation there is no doubt as to which group we should like our own children to belong. Those who have safely passed the first danger period are to be regarded as a select group in which the risk of exposure to infection is at a minimum, in marked contrast to the great risk among uninfected children.

Animal experiments have shown that the acquired antituberculous immunity is merely relative; inoculation with relatively large amounts of tubercle bacilli may break down this immunity. It is probable that the same occurs in man. Under ordinary and natural conditions, however, tuberculous infection is seldom if ever a massive one. It is highly probable that only a few virulent bacilli suffice to initiate air-borne lung infection, as Lange (1924, 1932, 1934) and Chaussé (1913–16) have demonstrated. The acquired antituberculous immunity is sufficiently great to protect the organism against such small infections. Air-borne exogenous superinfections, therefore, cannot produce any serious invasion.

The existence of an effective specific immunity against tuberculosis is, however, disputed. Many authors insist on the fact that such immunity is inadequate to prevent progressive disease, with development of new foci and flaring up of old ones. An antituberculous immunity of such a low degree that it permits progressive disease cannot be of any real value. Those who argue in this fashion cannot have grasped the quality of an acquired specific immunity. The specific immunity acquired by a first infection is directed against *new* exogenous infections with the same germ. This holds good for all infections that produce a specific immunity. A syphilitic man, for instance, is immune to a new syphilitic infection, while the already existing illness may progress without resistance. In tuberculosis the acquired immunity protects against exogenous superinfections, but it cannot on the other hand prevent the development of tuberculous disease from existing foci.

CAUSES OF SELECTIVE INFECTION

The question now arises: Why does pulmonary tuberculosis develop only in some of the people infected with tubercle bacilli while the majority escape? It is apparent that the specific antituberculous immunity has nothing to do with the resistance of those who escape pulmonary tuberculosis. The specific immunity of those who have a benign tuberculous infection certainly is not greater than in those who suffer from progressive disease; on the contrary, it is less. The course of clinical tuberculosis must therefore depend on other factors than the acquired specific immunity.

The position of the primary focus exercises no influence on the prognosis. I have already mentioned that probably the lungs are always infected, no matter where the primary focus may be. Cases are reported of primary bovine infection of the tonsils, with subsequent development of bovine pulmonary tuberculosis. It is apparent that this extension to the lungs is brought about by hæmatogenous spread.

Nor can the question be answered satisfactorily by the number of the infecting tubercle bacilli. I have just mentioned that the dosage of bacilli varies probably very little from case to case when the infection is air-borne. Neither has it been possible to prove that the virulence of the bacilli determines whether the infection shall remain encapsulated and latent throughout life, or sooner or later give rise to progressive pulmonary tuberculosis.

If then the course of tuberculosis is not dependent on the specific antituberculous immunity, nor on the quality and localisation of the first infection, the course of the disease must be determined by other factors neither residing in the infection itself nor controlled by it. I am inclined to believe that these factors reside in the organism's natural non-specific resistance. It is owing to their natural resistance that the majority of those infected with tubercle bacilli never acquire pulmonary tuberculosis. Contrariwise, an insufficient natural resistance is the cause of tuberculous deaths in infants and young children.

The degree of natural resistance is determined partly by exogenous and partly by endogenous factors. The influence of poverty, overcrowding, undernourishment, physical and mental strain, &c., cannot be under-estimated. Perhaps the most important of the endogenous factors is the influence of puberty. Pulmonary tuberculosis of the adult type does not exist, practically speaking, before puberty, while afterwards it is very common. It is quite likely that the liability to pulmonary tuberculosis is intimately linked up with endocrine activity. In this way may also the decreased resistance during pregnancy be explained, as well as the increased resistance in old people.

The Familial Factor

Neither external nor internal factors can account satisfactorily for the frequency of consumption in certain families. It is a fact that the standard of living, the risk of exogenous superinfections and other important environmental factors may be comparable in the consumption-ridden and the consumption-free families. In the infected members of the latter pulmonary tuberculosis does not develop. There must exist another factor which influences most members of one family and which is absent in most members of another family. This factor is probably associated with the constitution of the individual, this being, as is well known, often similar in members of the same family.

Consumption was considered a hereditary illness long before it was known to be infectious. When this became evident the frequency of pulmonary tuber-

culosis in certain families was ascribed to cross-infection. Later when the specific antituberculous immunity was detected, it was also made known that the majority of those in civilised countries are infected with tubercle bacilli before they reach adult age and are thereby rendered immune to cross-infection. The ravages caused by tuberculosis when it was first introduced to primitive races were due to the fact that they had not become previously immunised through tuberculous infection in childhood. Such was the opinion before the late war.

In the course of time, however, it became more and more evident that childhood tuberculous infection was not as general as formerly believed. It was found that more than 50 per cent. of all individuals, even in big cities, acquired their first infection during or after puberty, yet the infection did not generally produce any serious effects. It was apparent that pulmonary tuberculosis in grown-up civilised people could not be due to the absence of a specific antituberculous immunity.

What then would be the explanation for the severe course of tuberculosis among primitive races? And why should it be much more benign among civilised people? This problem is in some quarters thought to be satisfactorily explained in the following manner. A great number of primitive individuals and families have a very low resistance and readily succumb after infection. Those strains among civilised people that possess a similar liability to tuberculosis have already died out in earlier generations. The modern civilised populations correspond to a remnant of the original people; they have a good natural resistance to tuberculosis, and therefore have been able to survive the infection. This interpretation presupposes that the natural antituberculous resistance may be an inherited quality.

It has been known for a long time that heredity plays an important part in determining the course of tuberculosis. The proof of the manner in which this influence operates is not wholly without defects. These consist principally of an under-estimation of certain environmental factors that may be common to several members of the same family. The influence of heredity has been proved in a more reliable manner by the investigations of Diehl and von Verschuer (1933, 1936) on the course of tuberculosis in twins. They found rather clear-cut evidence that hereditary factors play an important rôle on the development and the course of tuberculosis. Thus tuberculosis runs a similar course more often in twins with similar hereditary qualities than in those with different hereditary qualities.

The natural resistance with which an individual is born is not a fixed and unchangeable quality—on the contrary, it is variable in a high degree. A person with a very good inherited resistance may develop pulmonary tuberculosis if exogenous and endogenous factors reduce this resistance. On the other hand, an unfavourable inherited quality may become neutralised by the removal of all the factors that lower resistance. The occurrence of pulmonary tuberculosis may be prevented by a combination of a good natural resistance and absence of unfavourable factors. A combination of a low inherited resistance and other unfavourable factors almost always leads to fatal pulmonary tuberculosis.

Two conditions determine, therefore, whether or not consumption shall result from a childhood infection: (1) the degree of unspecific, natural, and inherited antituberculous resistance; (2) the presence or absence of factors which unfavourably influence the natural antituberculous resistance.

Results of Infection

After this discussion of the probable causes of the development of pulmonary tuberculosis, we return to the vital question of the extent of the risk a tuberculous child runs. The opinion has sometimes been advanced that childhood infection is more dangerously disposed to the development of pulmonary tuberculosis than when the primary infection is contracted at a later date. I can find nothing to confirm this opinion. On the contrary, a childhood infection ought, theoretically speaking, to be the cause of pulmonary tuberculosis more infrequently than a recent primary infection in adult years. The primary focus of a childhood infection, together with its secondary hæmatogenous foci, usually become encapsulated and clinically healed when the infected individual becomes an adult and reaches the danger period of consumption. The foci produced by a primary infection during adult years are usually active and not healed when the danger period of consumption is ushered in. On the other hand, infected children who reach adult age are to a certain degree a select group. They have shown themselves to possess a natural resistance great enough to conquer the primary infection and to prevent development of miliary tuberculosis and tuberculous meningitis. They have already safely passed the first danger period, while the uninfected adults have still to pass through it. Among the latter there may be several with defective natural resistance who as soon as they come into contact with their first infection may acquire severe acute tuberculosis.

Unfortunately, no reliable reports are available at present on the comparative incidence of consumption among those that have acquired their first infection in childhood, and among those primarily infected as adults. In order to be of significance such investigations must especially consider the individual's hereditary and environmental conditions and not only the date at which infection took place. Until we possess better knowledge about these conditions we can only speculate on the degree of risk a childhood infection entails in comparison with a primary infection in adult life.

In Swedish sanatoria I have collected 519 cases of pulmonary tuberculosis of the adult type in which the tuberculous infection made itself manifest with an erythema nodosum. The probable date of the first infection is thus known. Now it turned out that only 81 of these cases acquired their first infection before puberty. It has already been mentioned that the primary infection at the present time occurs with about the same frequency both before and after puberty. The frequency of tuberculous erythema nodosum is, on the other hand, much greater in childhood than among adults. If the figures mentioned above concerning the date of the first infection in adult consumptives have any significance, they certainly do not indicate that the risk of contracting pulmonary tuberculosis of the adult type is considerably greater if the primary infection is acquired in childhood than in later years.

Summary

Children who have contracted tuberculous infection have to pass through two essentially different periods of danger. The first period begins when the primary infection manifests itself and lasts about 3 months. Infants and small children especially are threatened by miliary tuberculosis and tuberculous meningitis during this period. When an infected child has safely passed this first danger period it enters into a

rather harmless one which lasts until the beginning of puberty. Then begins the second danger period which lasts 2–3 decades and during which those who are infected may become prey to pulmonary tuberculosis of adult type.

The primary infection delivers the first prerequisites for pulmonary tuberculosis of adult type. It produces the necessary change in the mode of reaction of the lung tissue and it delivers the necessary infection of the lung either in form of the primary focus or in shape of secondary hæmatogenous foci or deposits of tubercle bacilli.

The mentioned two prerequisites are present in all infected people. Whether pulmonary tuberculosis of adult type shall arise from the existing lung infection or not depends on the degree of unspecific natural-resistance and on the presence or absence of environmental and certain endogenous factors able to influence this natural resistance in a positive or negative way.

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THE GASTRIC LESION IN PERNICIOUS ANÆMIA

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(WITH ILLUSTRATIVE PLATE)

Fenwick, in 1880, was the first in this country to describe atrophy of the gastric mucosa in pernicious anæmia. He recorded 4 cases of "essential anæmia" in all of which there was atrophy of the stomach and especially of the gastric mucosa. Nothnagel, almost at the same time (1879), described similar findings, but in all these cases the stomachs were unfixed and the histology uncertain. In 1900, however, Faber and Bloch published the first of their papers in which they described their findings in material fixed soon after death. They examined the stomachs from 8 patients dying from pernicious anæmia and found a "diffuse gastritis" in every case. Their findings have been generally accepted and have been supported by other workers.

Wallgren (1923–25) examined the gastro-intestinal tracts of 16 cases of pernicious anæmia and 2 cases of aplastic anæmia. He found a diffuse atrophy of the gastric mucosa in all the cases of pernicious anæmia but the stomach was normal in the 2 cases of aplastic anæmia. More recently Brown (1934) has analysed the autopsy records of 42 cases of pernicious anæmia. He states that "the picture of chronic gastritis was present in all but one case" and stresses the absence of acidophil cells in all but 5 cases; but his material was presumably unfixed. Jones, Benedict, and Hampton (1935) record the gastroscopic, surgical, and radiological examination of 5 typical cases of pernicious anæmia which were observed over a long period. They present evidence which, they believe, indicates that atrophy of the stomach occurs particularly during a relapse and not as an invariable accompaniment of the disease. They observed hypertrophic gastritis during a relapse and also during the early stages of a remission, but after specific treatment of the anæmia atrophy and hypertrophy of the gastric mucosa both tended to disappear.

The recent work of Meulengracht (1935) has shown that, in the pig, the intrinsic factor of Castle is produced in the pyloric region of the stomach and in the first part of the duodenum. It has been assumed that this is also true of man and that there is, in pernicious anæmia, a diffuse atrophic lesion of the stomach probably also involving the duodenum. It has been supposed that this would account for the absence of the intrinsic factor in the gastric juice of pernicious anæmia patients.

AUTHORS' OBSERVATIONS

During the past two years we have been able to examine the stomachs, fixed soon after death, from 7 cases of pernicious anæmia. The mode of fixation and the histological technique employed have been similar to those already described by one of us (Magnus 1937). The essential point in the technique was the examination of large areas of mucosa by rolling up long strips of the stomach into "Swiss rolls" and cutting sections of the whole roll.

Of our 7 cases 1 had subacute combined degeneration of the cord which was presumably the cause of death. In the other cases death was due to abandonment of treatment by the patient, or to intercurrent disease.

Our findings in these cases have been unexpected and of sufficient importance to warrant publication without waiting for further material to accumulate.

Macroscopic appearances.—The naked-eye changes observed have been identical in all cases. The upper two-thirds of the stomach—that is, the region of the body mucosa—has shown a severe atrophy so that this area is reduced to the thinness of parchment. At the junction of the body with the pyloric mucosa, however, there is a transition, usually abrupt, to the normal thickness of the stomach wall and this is maintained throughout the whole of the pyloric antrum and duodenum. The mucosal surface in the upper atrophic region is flattened and areæ gastricæ can no longer be seen whilst in the pyloric region the mucosal surface is normal.

These macroscopic appearances are so striking and characteristic that it is possible to recognise the stomach from a case of pernicious anæmia by naked-eye examination alone.

Microscopic appearances.—Histological examination confirms the naked-eye distribution of the atrophy. In the body mucosal region there is a severe atrophy involving all the coats of the stomach wall (Figs. I and II on Plate) and it is clear that the parchment-like thinness observed macroscopically is not due to mucosal atrophy alone.

In the mucosa (Figs. III and IV) all that remains is the surface epithelium and a few scattered glands lined by mucus-producing cells, whilst the specialised oxyntic and peptic cells have entirely disappeared. Yet, in spite of this, there is a complete absence of

fibrosis, cellular infiltration, obliterative endarteritis, or other evidence of past inflammation and there is a corresponding absence of fibrosis in the submucosa and subserosa. The muscle coat shows atrophy, but here also there is an absence of fibrosis.

In several of the stomachs large areas of intestinal epithelium were present in the atrophic body mucosa, but not in the normal pyloric mucosa. It has been shown elsewhere (Magnus 1937) that intestinal epithelium occurring in the stomach has all the characteristics of true intestinal epithelium and is to be regarded as an example of metaplasia.

In all 7 stomachs there was no suggestion of atrophy or of an inflammatory lesion in the pyloric or duodenal mucosæ (Figs. V and VI) and Brunner's glands also showed no abnormality.

DISCUSSION

In all the 7 cases of pernicious anæmia examined the stomachs have shown a profound atrophy involving all the coats of the stomach wall and localised in its distribution to the body mucosa region. The pyloric antrum and duodenum, where it has been assumed that the intrinsic factor of Castle is produced, have shown no pathological abnormality. There is, therefore, a morbid anatomical basis for the achylia gastrica present in pernicious anæmia but not for the absence of the intrinsic factor if we assume that it is produced in the regions already stated. It is conceivable, however, that a lesion may be present in the pyloro-duodenal region somewhat similar to that found in the cells of the islets of Langerhans in diabetes, but that it has not yet been possible to demonstrate any such lesion by the histological methods so far employed.

Shortly after we had examined our fourth case Meulengracht (1937), at the first meeting of the German Hæmatological Society held at Münster in May of last year, described similar results in several cases, a finding which was completely the reverse of what he had expected from his animal observations. He stated, however, that he was proposing to estimate the total amount of pyloric and Brunnerian glandular tissue present and compare the result with normal controls.

It has been generally assumed that the gastric lesion present in pernicious anæmia is the end-result of an inflammatory gastritis, but an examination of our material shows that this is not so. None of the criteria of a chronic inflammatory process are present and a lesion similar to the one present in pernicious anæmia stomachs has not been found in association with simple or malignant ulceration. We have had the opportunity of examining the stomachs, fixed soon after death, from 2 cases of severe anæmia not pernicious in type (one aleukæmic leukæmia, the other orthochromic anæmia of pregnancy) and in both of these the stomachs were normal. In addition, no lesion resembling that present in the pernicious anæmia stomachs has been found in over 50 stomachs from unselected cases fixed soon after death. Unfortunately we have not been able to obtain any material from patients dying with an achlorhydric anæmia.

From the evidence available it appears that the gastric lesion present in pernicious anæmia is almost certainly not the end-result of an inflammatory gastritis, but is to be regarded as an atrophic process, the cause of which is not yet known, but which may be the end-result of some endocrine or nutritional deficiency or may even be congenital in origin. From its nature it is unlikely that regeneration to normal gastric mucosa ever occurs.

SUMMARY

1. The stomachs from 7 cases of pernicious anæmia have been examined. These were fixed as soon as possible after death.

2. In all cases a characteristic lesion has been found localised in its distribution to the region of the body mucosa and not affecting the pyloro-duodenal region.

3. This lesion affects all the coats of the stomach wall and from its histological appearances is almost certainly not the end-result of an inflammatory process.

4. The possible bearing of these findings on the problem of the site of formation of the intrinsic factor in pernicious anæmia is discussed.

One of us (H. A. M.) has carried out this investigation, as part of a research into the pathology of gastritis, with the aid of a grant from the cancer department of St. Bartholomew's Hospital.

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ALCOHOLIC LABYRINTHINE INJECTION

THROUGH THE OVAL WINDOW IN THE TREATMENT OF AURAL VERTIGO

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(WITH ILLUSTRATIONS ON PLATE)

The work upon which this paper is based has been carried out in the first place upon the cadaver and more recently upon the living subject. Its object has been to determine the detailed destination of alcohol when injected into the labyrinth through the oval window, to what extent such an injection affects the cochlea and/or semicircular canals, what is the optimum quantity of alcohol to inject, and finally, to devise a technique by which this procedure could be applied with safety to the living subject.

Some years ago Sydney Scott showed that by alcoholic injection the function of the labyrinth could be destroyed in pigeons. Since that time Mollison (1931, 1934–36) has published a series of 30 cases of aural vertigo upon whom a preliminary mastoid operation was performed and alcohol introduced into the labyrinth through the exposed external semicircular canal. Of these cases 73 per cent. were cured of their vertigo. Mill (1936) has published a similar series of 7 cases treated in the same way with good results. Wright showed a patient in 1934 in whom the labyrinth had been injected with alcohol through the oval window. This patient was completely cured of her labyrinthine symptoms but a severe otitis media and facial paralysis occurred. He has kindly allowed me to mention that this paralysis is still present, though the suppurative condition subsided after some months and the ear has been dry since that time. He expressed the hope when the case was shown that by the injection of smaller quantities of alcohol these complications could be avoided.

Many cases, it may be said the majority (Wright 1937), of aural vertigo respond and are relieved of symptoms by the removal of focal sepsis. It is not the object of this paper to discuss the selection of cases, but rather to consider the limited number that do not respond to this and other forms of treatment, and in which destruction of labyrinthine function appears to be the only step by which relief from symptoms can be obtained.

The advantage of injection through the oval window as opposed to other routes is that no preliminary mastoid operation is necessary, the surgical procedure to which the patient is subjected being the comparatively minor one of passing an injection needle through the drum and oval window into the labyrinthine vestibule.

It has been with the object, in addition to those already stated, of determining whether and by what means the known complications of facial palsy and the otitis media can be avoided that this work has been carried out. It is believed that these objects have been attained and two cases have been successfully treated, but the conclusions reached, in so far as they are conclusions, must be regarded as no more than preliminary in that only two clinical cases are under review.

EXPERIMENTS ON CADAVERS

The method of investigation carried out upon the cadaver has been to remove in toto that portion of the skull containing the labyrinth, middle ear, and external bony auditory meatus. The anterior meatal wall, together with the drum, malleus, and incus, has then been dissected away, thus leaving a mobile labyrinthine unit that can be injected and investigated at will. In all cases the injection has been made through the oval window and foot-plate of the stapes, since this is the most direct method of approach to the labyrinth in the living subject. The situation and angle at which the round window is set prevents the possibility of this method of approach which, even were this not so, would still be less suitable owing to the greater distance through which alcohol would have to travel before reaching the semicircular canals.

The first factor that became apparent upon making such an injection was not unexpected. The labyrinth, from a mechanical point of view, is a cavity filled with fluid and surrounded by bony walls. Any injection of fluid into it, therefore, can only be made at the expense of an equal quantity of fluid, which is simultaneously displaced, returning along the side of the injecting needle into the middle-ear cavity, and consisting of the injected alcohol diluted only to a slight extent by the original labyrinthine contents.

It seems a matter of the first importance to prevent this displacement of fluid into the middle ear, as otherwise the extent to which the alcohol reaches the whole or part of the labyrinthine structures must remain an uncertain and variable factor in different cases. In the second place the return of alcohol into the middle-ear cavity would inevitably give rise to an otitis media and possibly to some sloughing of mucous membrane. It is evident also that facial nerve palsy may be brought about by this means, since the thin bony walls of the canal in which the nerve lies appear to be an inadequate protection against adjacent alcohol.

The principle therefore of applying balanced and simultaneous suction at the time of making the injection was devised. A needle with a double lumen is used which is passed through the drum, middle ear, and oval window into the labyrinthine vestibule. By this means the middle ear can be isolated and, so long as the rate of injection and strength of suction remain constant and balanced, a circulation, rather than an injection, of alcohol can be established in the labyrinth without any overflow of fluid into the middle ear. An additional advantage is that the possibility of injecting too large a quantity of alcohol need not be feared.

Working upon these lines two series of cadaverous labyrinths were injected with a saturated solution of sodium iodide, and the extent to which a total injection of the labyrinth had been made investigated by subsequent X ray. In one series simple injections without suction were made, fluid being allowed to regurgitate into the middle ear. In the second series balanced injection and suction was used, and regurgitation thus prevented. The following findings were obtained:—

Without suction (with regurgitation).—(1) If injection was stopped as soon as there was regurgitation of fluid into the middle ear, an inadequate injection of the semicircular canals was obtained (Fig. I on Plate). It may therefore be said that unless suction is used it is not possible to obtain an anatomically complete labyrinthine injection without the middle ear being flooded with regurgitant alcohol.

(2) With less than ½ c.cm. the semicircular canals are irregularly and incompletely filled (Fig. II).

(3) The smallest quantity with which there was full filling of the canals in some instances was found to be ½ c.cm. (Fig. III), but results were inconsistent, as can be seen from Fig. IV, where 3 c.cm. was injected, and part of the superior canal is still unfilled.

With balanced suction (regurgitation prevented).—Fig. V is the picture uniformly obtained by this method. It will be seen that all the canals are well and uniformly filled. Comparison of Figs. IV and V well demonstrates a further point that is thought to be of importance—when suction is used, the vestibule is left empty. In view of the close proximity of the VIIth nerve canal to the vestibule, this may prove to be a matter of moment, and will be referred to again later.

It will be noticed that in none of the foregoing Figures has the injected fluid passed into the cochlea. This fact was found to depend upon one anatomical and two other factors. Fluid injected into the vestibule can pass readily into the semicircular canals because these communicate with the vestibule at their two ends, and there is therefore no mechanical obstruction to fluid circulating through them, returning to the vestibule, and being then carried away through the suction needle. The cochlea on the other hand is, mechanically, a long tube connected with the vestibule at one end only, the other terminating blindly at the foramen rotundum. Fluid therein circulates therefore much less readily, and under no circumstances could the cochlea be filled with a saturated solution of sodium iodide, the considerable viscosity of this solution preventing its satisfactory entry.

A further series of injections, with suction, was therefore performed, using an alcoholic solution of carbolfuchsin as the injected fluid. The bones were subsequently dissected and the cochlea and canals examined for staining with the dye. By this means it was found that both the semicircular canals and cochlea can be satisfactorily filled with alcohol if 3 c.cm. of alcohol is circulated with balanced suction, a lesser quantity resulting in partial cochlear filling only. By the use, with suction, of no more than ½ c.cm. of alcohol it was found that the semicircular canals were well filled and the cochlea was unaffected. This latter fact, in that the canals might be destroyed for vertigo and some degree of hearing retained, is

thought to be of theoretical value only. In the first place, the majority of these patients suffer from tinnitus in addition to vertigo; secondly tinnitus, if absent, might be induced by such an injection; and lastly, the injection would in itself in all probability deprive the patient of useful hearing in spite of the absence of cochlea filling.

In order more fully to investigate the possible routes by which injected alcohol could reach and damage the facial nerve, a series of labyrinths were injected with alcoholic carbolfuchsin and dissection of the bones deferred for 24 hours. A control series were dissected immediately after injection. In none of the control series was the facial nerve stained by the dye, but in the deferred series some staining of the nerve was present in 60 per cent. of instances, alcohol having passed through the bony walls of the vestibule into the adjacent VIIth nerve canal. It is for this reason that, as previously stated, a vestibule emptied of alcohol at the end of injection is thought to be desirable. It is realised that this finding is not entirely comparable with what might be found in the living subject, but it is thought to be significant enough to call for an attempt at preventing its possible occurrence. This has been done by duplicating the injecting apparatus, so that the injection of alcohol can be followed after an interval by a similar injection of saline through the same needle, without removing it from the vestibule. By this means the alcohol is washed out of the labyrinth and the latter irrigated with saline, thus avoiding any alcohol remaining in the vestibule after the injection is finished.

From the evidence as so far stated one is apparently justified in claiming that the labyrinth can be fully injected with alcohol through the oval window, while the risk of facial nerve involvement is reduced to a minimum. It is hoped that this risk will prove to be non-existent, but this can only be established by the treatment and observation of a larger number of cases.

TREATMENT OF THE LIVING SUBJECT

Apparatus has been devised in which gravity is used as the force for giving the injection (this is obtainable from the Medical Supply Association Ltd., London, W.C.). In this way a constant rate and strength is obtained. The time taken by this apparatus to inject 3 c.cm. of alcohol is 9 sec., the outside bore of the injecting component of the needle (made by Mayer and Phelps Ltd., London, W.) being No. 23 standard wire gauge. It has been found desirable to use a slightly larger bore for the suction component, the outside bore here being No. 21, and the degree of suction needed to balance this rate of injection is 15 in. of mercury. An initial injection of a few drops of 1/1000 adrenaline through the drum into the middle ear is of assistance in assuring a bloodless field. The characteristic sensation transmitted to the operator's hand when the needle pierces the foot-plate of the stapes is identical on the cadaver and in the living subject.

CASE 1.—A woman aged 48 with attacks of vertigo of varying degree, and occurring up to five and six times a day for 18 months. Frequency and severity of attacks had increased during the last 3 months. She fell at times, was nauseated but did not vomit. Increasing deafness left ear for similar period; severe tinnitus left ear for 2 yrs.; drums normal; deafness was of the nerve type with reduced bone conduction and greater loss of high than of low tones. Nose and nasal sinuses normal. Eustachian tubes clear. Wassermann negative. Blood count normal. Central nervous system normal. No focal sepsis.

Operation.—3 c.cm. alcohol circulated through left labyrinth under general anæsthesia. Left eye deviated fully to right at start of injection and almost immediately returned to central position; no further movement. Alcohol left in situ 10 min. after which 3 c.cm. normal saline was circulated through labyrinth and needle withdrawn. There was intense giddiness with coarse nystagmus to the right upon her regaining consciousness, this being due to an overaction of the unopposed and normal right labyrinth. This persisted for three days and improved thereafter daily. Patient started to walk after 14 days and left hospital after six weeks, walking steadily. No vertigo, other than the compensatory vertigo of the first 10 days, has been experienced since the injection. The needle perforation has healed and the drum has returned to normal. Labyrinthine function is found to be totally destroyed.*

CASE 2.—A girl aged 19 had right otorrhœa 12 years ago. None since. Severe attacks of vertigo on an average of every six days for the last 4 yrs. She vomited, but never fell. Deafness of the nerve type; no tinnitus; apart from a small posterior scar the drum was perfectly normal; no active sepsis. Blood count normal. Wassermann negative. Eustachian tubes clear. Central nervous system normal. No focal sepsis.

Operation.—3 c.cm. alcohol circulated through right labyrinth and irrigated with saline as in previous case. Alcohol left in situ for 3½ min. only. Period of compensatory vertigo as in Case 1, but she made more rapid recovery and was walking well on the eleventh day. The perforation has healed and the drum has returned to normal. Labyrinthine function on examination is found to be totally destroyed. No vertigo, other than that during the compensatory period, has been experienced since injection.

Both cases were closely observed and at no time was there any suggestion of facial weakness. In Case 2 a large blood clot collected overlying the perforation in the drum, which it was thought best to leave undisturbed. Fluid, however, collected beneath the drum and this was evacuated, the ear discharging thereafter for 4 days. It is hoped that this complication can be avoided in future. No tinnitus was present in Case 2 before or after injection, but in Case 1 it is of interest to note that the tinnitus was unaffected in spite of cochlea destruction. The symptom in this case had been present for two years and had, it must be assumed, become centralised in the central nervous system. Analogous cases have been reported of persistence of tinnitus after homolateral section of the VIIIth nerve. Examination of a larger number of cases might prove illuminating in ascertaining the length of time that tinnitus can be present without centralisation.

SUMMARY

1. An investigation into the effects of alcoholic labyrinthine injection through the oval window has been carried out upon the cadaver.

2. The procedure results in total destruction of labyrinthine function.

3. The incidence of the known possible complications of facial palsy and otitis media is thought to have been reduced to a minimum.*

4. Two women treated in this way were entirely relieved of aural vertigo.

I wish to acknowledge my indebtedness to Dr. A. Robinson Thomas for his assistance in the radiography.

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* This patient, after five months' freedom, has recently reported some return of giddiness. Opportunity for adequate observation is required before further comment is made.

ARTERITIS OF THE TEMPORAL VESSELS

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(WITH ILLUSTRATION ON PLATE)

In America attention has been drawn in recent years to arteritis of the temporal vessels. Horton and Magath (1934, 1937), and Macdonald and Moser (1937) have between them observed 8 cases of arteritis of these vessels, and apart from one exception only the temporal arteries have been involved. The symptoms and the course of the illness have in all cases been very similar and the disease has affected persons in the same age-group. Horton and Magath (1937) in a recent account give a full summary of the nature of the symptoms. "A non-fatal disease which is characterised by periarteritis and arteritis of the temporal vessels with painful areas over the scalp, and which is accompanied by headache, general malaise, lassitude, weakness, night sweats, anorexia, loss of weight, anæmia, and mild leucocytosis." Pain in the jaw on opening the mouth, and earache are other possible symptoms. The course of the condition as seen by these writers is in all cases towards recovery, and its duration 2–6 months, though temporary relapses were noted. The incidence of the condition is almost invariably in persons of over 60.

Horton, Magath, and Brown (1934) consider that there is in this condition "a new clinical syndrome" and they describe it as a previously undescribed form. They attempt a clinical and pathological differentiation between the temporal arteritis in their cases, and other forms of arteritis that have been described as pathological entities, such as polyarteritis nodosa, thrombo-angiitis obliterans, rheumatic arteritis, and other forms associated with recognised infections. The Wassermann reaction has always been negative in their cases, and indeed no cause has yet been found.

There is great difficulty in making a confident separation of some of the forms of arteritis into groups on account of the lack of knowledge about the causation. The causative factor has yet to be found in thrombo-angiitis obliterans, in polyarteritis nodosa, in the rheumatic states, and in these cases of temporal arteritis. These groups therefore are separated on clinical and histological grounds, and a comparison is given in the Table. This embodies the findings of Pappenheimer and von Glahn (1926) in rheumatic arteritis, and in the other forms evidence is included from Boyd (1935), Ophüls (1923), and from authorities quoted elsewhere in this paper. In the Table the differences between the various forms have been stressed, yet there is evident wide overlapping of the clinical and pathological findings in the four groups of arteritis.

CASE REPORTS

Two cases of temporal arteritis have been observed by us and, as in the American cases, these were in old people who developed signs of a prolonged, febrile, debilitating illness of unknown ætiology. Severe headache was a feature of the illness in both cases. The temporal arteries stood out as tender pink cords and there were nodules on them and on the neighbouring scalp. Pulsation gradually disappeared from the distal parts of the affected arteries subsequent to the appearance of the inflammation. In the first case, thrombosis also occurred in both retinal arteries, causing a great and persistent visual impairment; and much narrowing of the arteries of the right foot and of the left brachial artery also was present. This patient had a palpable liver and twice had diarrhœa, findings of doubtful significance. The second patient died at the age of 74, two years after the illness. She showed no visceral symptoms. With the exception of visual impairment and diminished circulation in the right foot and left arm in the first patient, the condition cleared up, at any rate temporarily, in both cases.

FIRST CASE

A housewife, aged 66, had complained of pains in the limbs for eight months and of headaches for a month; sight had been lost in the left eye for a week. She had had no illness of note apart from scarlet fever in childhood. She had had seven miscarriages and had lost five children in infancy. Her present illness dated back to May, 1936, nine months before her admission to Hammersmith Hospital. She was at first merely troubled by extreme fatigue, but in June she had pains in the thighs and knees, which later spread to the ankles; by July, these were so severe that she was confined to bed. She was feverish and often sweated at night during the next two months. In August she had pains in all four limbs. By October she was much better, but the pains were still noticeable in the limbs when she moved. In November she was able to get up, but she had lost much weight and felt very weak. She went out, though unable to walk, in December and remained fairly well until the end of the month when she became stiff in the neck. Early in January, 1937, she began to get headache all over her head. The mouth became stiff, and her ears "felt swollen in the lobes." The back of her head was tender and she was able to feel tender little swellings on her forehead. Her mouth was painful to open and the headaches became so severe that she "thought they would drive her mad." On Feb. 2nd a spot appeared in front of the left eye and during the next five days "it was as though a curtain was being drawn down over the left eye, removing all sight from it." A haziness began to develop in the right eye just before her admission on Feb. 8th.

On admission.—A thin, pale, ill-looking old lady suffering from pronounced photophobia. Pulse-rate 100, temperature normal. Pyorrhœa around the lower incisors. There was slight thickening of the radial arteries; blood pressure 160/80 mm. Hg. Heart normal; lungs emphysematous. Liver just felt but not tender; no other abnormal abdominal signs. There was considerable muscular wasting. The shoulders and knees were stiff and painful, and slightly crepitant when moved. Extension of the elbows was painful and somewhat limited. The metacarpophalangeal joints were slightly swollen, but there was no swelling of any other joints.

LEGENDS TO ILLUSTRATIVE PLATE

(*See opposite page*)

DRS. MAGNUS and UNGLEY: *The Gastric Lesion in Pernicious Anæmia*

I.—The thickness of the stomach wall in the body mucosal region of a normal stomach. (× 9.)

II.—The thickness of the stomach wall in the body mucosal region of a pernicious anæmia stomach. (× 9.)

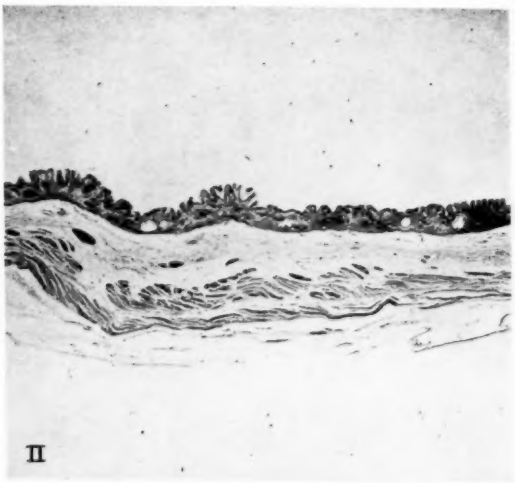
III.—Normal body mucosa. (× 102.)

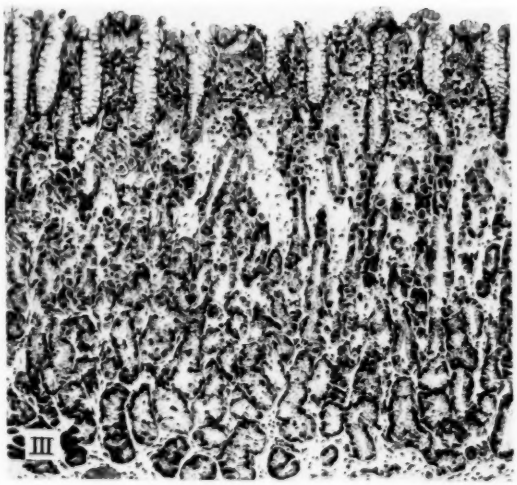
IV.—The body mucosa in a pernicious anæmia stomach. (× 138.)

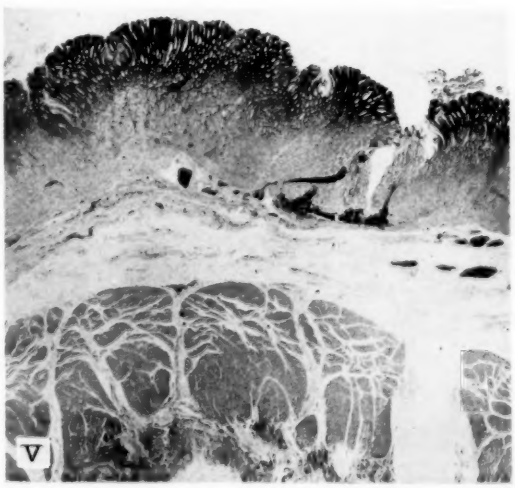
V.—The thickness of the stomach wall in the pyloric region of a pernicious anæmia stomach. (× 15.)

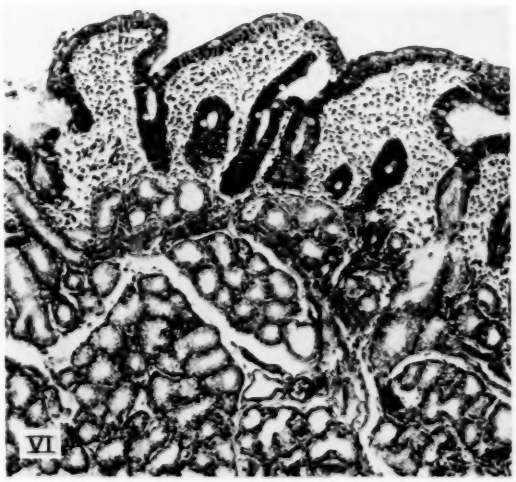
VI.—Duodenal mucosa and Brunner's glands in a pernicious anæmia stomach. (× 96.)

DRS. MAGNUS AND UNGLEY: THE GASTRIC LESION IN PERNICIOUS ANÆMIA

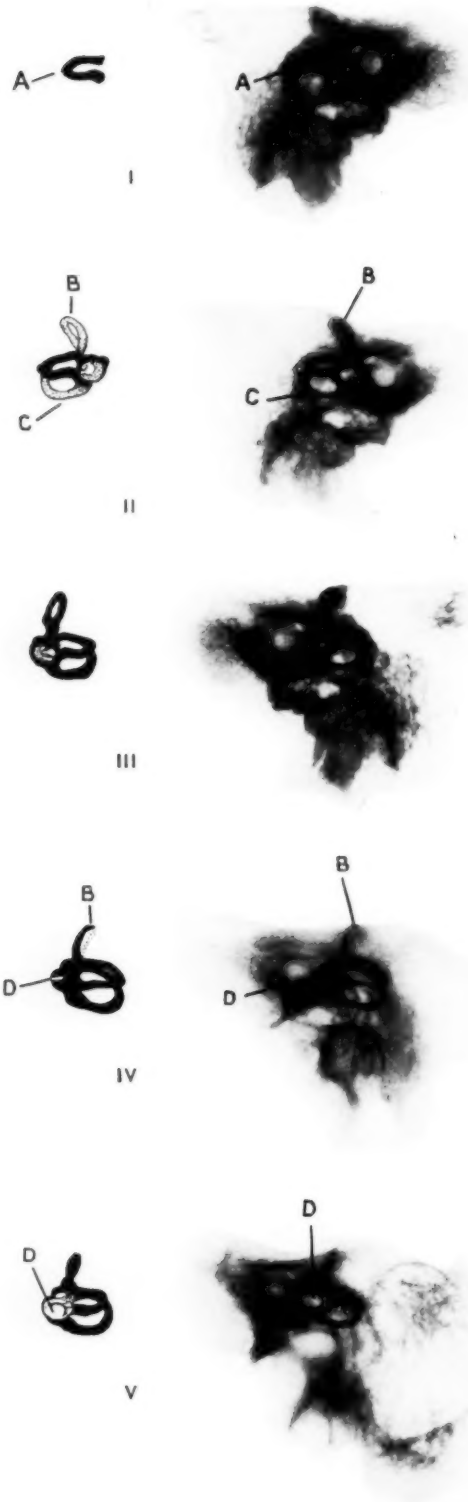




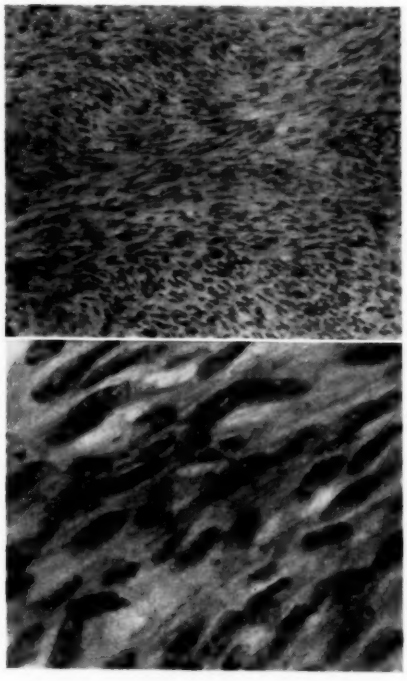




MR. PEACOCK : LABYRINTHINE INJECTION FOR AURAL VERTIGO



MR. SWORN & DR. COOPER : LEIOMYOMA OF THE STOMACH



DR. JENNINGS : TEMPORAL ARTERITIS

Examination of head.—The left eye was completely blind and vision in the right eye was slightly impaired. The left pupil was large and failed to react to light. In the left fundus oculi the disc was pale with a small central hæmorrhage, and the retinal arteries were narrow. Mr. R. C. Davenport reported on Feb. 11th a definite obstruction of the central artery of the left retina. At this time lateral eye movements caused pain in the left eye. In the right eye there were at first no obvious ophthalmoscopic signs. On admission the anterior branches of both temporal arteries were thickened and tender, the thickening being greater on the left side. The scalp was very tender in both frontal and occipital regions. On the right side there were a few small, shotty, tender nodules on the forehead near the termination of the anterior temporal artery. During the next few days both anterior temporal branches became pink, and were more tender and thickened in their course on the forehead. Pulsation diminished and became impalpable in these arterial segments during the first ten days in hospital. At the same time vision in the right eye rapidly deteriorated, and by Feb. 17th the right disc had become pale and there was a small hæmorrhage below and near the disc. There was practically no vision in the lower half of the field, and on Feb. 25th Mr. Davenport reported a progressive obliteration of the right central retinal artery with especial narrowing of its upper branches. From about this time the inflammation began to subside, and in the following month the swollen temporal arteries became less prominent and tender, finally becoming almost impalpable. The retinal hæmorrhages absorbed and the headache, eye pains, and photophobia were lost. At the same time the patient felt that she could see more clearly, although there was no increase in the visual fields. She was able to read large print with the right eye.

Histology.—On March 10th, during the period of subsidence of the inflammation, a small section of the proximal part of the right anterior temporal artery was removed by Mr. A. J. Watson for histological examination (Fig. I on Plate). Dr. John Gray's report was as follows: "Chronic and active arteritis. The *chronic* change affects all coats producing an extensive vascularisation and fibrosis. The intima is thick, with many fibroblasts and some mononuclear cells. The media is also fibrosed and its muscular and elastic elements are disorganised and largely destroyed. It also shows some cells of imperfect multinucleated giant cell form. The adventitia is fibrosed. In addition the *active* process is signalised by the presence of numerous polymorphs. The histology does not enable one to name the infective agent. It is not unlike that described in rheumatic arteritis, but this description is applied to vessels of internal organs. Polyarteritis nodosa is *not* excluded by the appearances."

Progress.—The subsequent general progress of the patient was slow and liable to brief set-backs, but at the end of three months she was able to get up. Her knees were stiff, and even in the fourth and fifth months when she walked her gait was very uncertain. Her weight was always low (7 st.) and showed small fluctuations. There was practically no fever except immediately after dental extractions, and the pulse-rate settled to 80–90. The sedimentation-rate remained raised, but was lowest in April when the weight was highest. Apart from two short bouts of diarrhœa, there were no visceral manifestations. The arteries showed no further change after the inflammation had subsided, but pulsation became perceptible in the right temporal artery for about an inch above the outer canthus. The arterial pulses in the right foot remained almost imperceptible, and an inequality in the brachial pulse was noted during the sixth month. Blood pressure in the right arm at this time was 155/80, and in the left arm 120/80 mm. Hg.

When seen in December four months after discharge from hospital her general condition was excellent and she had gained nearly a stone in weight. The pulse changes were much as before, the left radial being very hard to feel. Blood pressure in right arm was 165/100, in the left 130/95. The temporal and retinal arteries were unchanged.

Further investigations.—Blood counts:—

February.		April, and subsequently.	
Red cells ..	.. 5,200,000	Red cells ..	.. 4,800,000
Hæmoglobin	.. 84%	Hæmoglobin	.. 78%
Colour-index	.. 0·81	Colour-index	.. 0·8
Leucocytes	.. 13,000	Leucocytes	.. 10,000

Normal differential throughout.

Wassermann reaction negative. Sedimentation-rate (Westergren): 108 mm. in the first hour in February, 18 mm. at the end of March, 68 mm. in June, and 48 mm. in August. Urine: Specific gravity 1008–1030 on admission; a few leucocytes and red blood-cells, and an infection with *Bacillus coli*. In July some hyaline and granular casts also were present. Radiography: Lungs emphysematous, left ventricle very slightly enlarged; left wrist showed general bone decalcification with small oval translucent areas in distal ends of radius and ulna; the articular surfaces of the wrist-joint were intact. Sinuses were all normally translucent.

SECOND CASE

An unmarried woman aged 72 complained of headaches and not feeling up to the mark. She had had no serious illnesses; good health until the end of 1930. At the beginning of 1931 she began to feel weak and out of sorts. Her appetite became bad and her food seemed dull and tasteless. She then began to complain of a dull headache in the right temporal region, and at night had sharp shooting pains over the right temple. This headache persisted for some weeks and then gradually improved. While she had the headache there was tenderness on pressure over the temporal region. After a few weeks the same symptoms developed on the left side and were more severe. After the headaches came on she thought she had been running a temperature. Apart from these she had no other symptoms. Her bowels were regular; she had no trouble with her urine; she had not lost weight. She had never been liable to colds and as far as she knew had never

LEGENDS TO ILLUSTRATIVE PLATE

(*See opposite page*)

MR. PEACOCK: *Alcoholic Labyrinthine Injection through the Oval Window in the Treatment of Aural Vertigo*

I.—No suction. Injection stopped immediately regurgitation occurred. (A) External canal partly filled. Others empty.

II.—No suction. ¼ c.cm. injected. (B) Superior, and (C) posterior canal, both poorly filled.

III.—No suction. ½ c.cm. injected. Canals well filled.

IV.—No suction. 3 c.cm. injected. (B) Superior canal only partly filled. (D) Vestibule full.

V.—With balanced suction. All canals well filled. (D) Vestibule empty.

MR. SWORN & DR. COOPER: *Leiomyoma of the Stomach*

FIG. II.—Sections of tumour, showing plain muscle. Above, × 175. Below, × 900.

DR. JENNINGS: *Temporal Arteritis*

FIG. I (CASE 1).—Longitudinal section of wall of temporal artery (× 100). (Verhoeff-van Gieson.) Shows thickened cellular, and fibrotic intima (A) with ruptured internal elastic lamina (dark stain); disorganisation and fibrosis of media with leucocyte and giant-cell invasion (B); and fibrosis of adventitia (C).

had sinus trouble. There was no history of injury to the head. All her teeth had been removed some years before.

On admission.—A woman who looked ill. There was considerable arterio-sclerosis. The heart was not clinically enlarged and showed no abnormality. Chest slightly emphysematous, but not bronchitic. Blood pressure 160/90 mm. Hg. Radial and brachial arteries thickened and tortuous; retinal arteries only slightly tortuous. Spleen and liver not palpable; abdomen normal. The central nervous system was also normal.

Examination of head.—The temporal arteries on both sides of the skull were irregularly thickened and tortuous, and felt rather nodular. There was definite tenderness on pressure over the lines of the arteries and its branches on the left side; the skin over the line of the arteries was reddened and slightly inflamed. In places the subcutaneous tissues seemed to be adherent to the artery (see Fig. II).

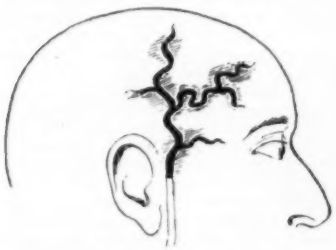


FIG. II.—Diagram showing extent of temporal arteritis in Case 2. The condition was similar on the left side. Over the shaded areas the skin was inflamed and reddened.

Further investigations.—The patient was under Dr. Leslie Cole's care in Addenbrooke's Hospital, Cambridge, for five days. She did not wish to stay in hospital longer and was discharged home. While an in-patient her evening temperatures were 99–100°. Other findings were as follows: Blood culture negative. Blood count:—

Red cells ..	.. 4,500,000	Polymorphs ..	.. 86%
Hæmoglobin	.. 48%	Small lymphocytes	.. 9%
Colour-index	.. 0·53	Large "	.. 3%
Leucocytes	.. 9,100	Eosinophils ..	.. 1%
		Basophils ..	.. 1%

Radiograms of chest and sinuses normal. Urine: specific gravity 1020; no chemical or microscopic abnormalities, and two catheter specimens were sterile on culture; subsequent to discharge *B. coli* were found in the urine. Electrocardiogram normal, but for a sinus tachycardia of 100–120. Wassermann reaction was not done.

Progress.—After discharge, the general and local conditions improved considerably, but little more is known of this patient apart from the fact that she died about two years after the acute illness.

Dr. Leslie Cole who has kindly supplied me with these details of his case has also made a diagram (Fig. II) which shows the extent of the disease. He remarks that "the diagnosis made then was subacute periarteritis, but the condition was a very strange one."

TREATMENT

Apart from general measures, treatment must obviously be empirical in these cases. In Case 1 potassium iodide and sodium salicylate were used, and iron was given to relieve the anæmia. This patient had early joint changes, and like three of the cases of Horton and Magath, showed definite pyorrhœa; but naturally in old subjects these were not matters for much comment. The oral sepsis was eliminated from Case 1 at the end of her third month in hospital.

DISCUSSION

Horton and Magath have described temporal arteritis as a "new clinical entity," but it is evident that as in at least three other forms of arteritis, a cause must be found before their group of cases can profitably be described as something new. With this knowledge it might be found necessary to modify the usual view of polyarteritis nodosa and to group with it the cases of temporal arteritis; or on the other hand proof might be afforded to those who do not believe that polyarteritis nodosa is itself a disease entity. The section of artery taken from Case 1 showed changes similar to, though rather less acute than, those seen by Horton, Magath, and Brown (1934). This was probably because it was removed in the stage of subsidence, and from a place proximal to the main inflammation. It is significant that Dr. Gray without knowledge of the case-history, found appearances resembling those of rheumatic arteritis and at the same time was unable to exclude polyarteritis nodosa as a possible diagnosis. In this connexion it is important to remember the strong association of rheumatism and polyarteritis nodosa which was demonstrated by Friedberg and Gross (1934). In a small series they found 6 cases of evident polyarteritis nodosa whose hearts showed rheumatic endocarditis and Aschoff bodies in the myocardium. Muscle and joint pains, fever, sweating, and anæmia are findings both in the rheumatic states and in polyarteritis nodosa. Such symptoms were present in our Case 1, in which the joint changes were suggestive of mild rheumatoid arthritis; but in so old a patient they were of little diagnostic value.

Though Gruber (1925) has denied that polyarteritis nodosa is a disease sui generis, others consider that it may be caused by a virus. The association of polyarteritis nodosa and rheumatic manifestations suggests the interesting possibility that some such virus as has been described in rheumatic fever (Schlesinger and others 1935), and also in rheumatoid arthritis (Eagles and others 1937), may be the causative agent in all these similar forms of arteritis. That thrombo-angiitis obliterans also may be caused by an infection is suggested by Allen and Lauderdale (1936) in their account of its supposed transmission from a patient to a surgeon when a spicule of bone penetrated the surgeon's finger during operation. Unfortunately these authors give us no histological proof of their supposition.

In general, polyarteritis nodosa shows acute, widespread, and fatal lesions in vital organs, while thrombo-angiitis obliterans and temporal arteritis are comparatively chronic and localised. But thrombo-angiitis may be widespread and rapidly fatal, with involvement of both visceral and retinal vessels (Birnbaum and others 1934). Retinal vessels may also be inflamed in polyarteritis nodosa (Arkin 1930) and in "temporal arteritis." Our first case showed retinal arteritis, and in the American cases "retinal phlebitis" with hæmorrhages and exudates was described in two cases. These two conditions are similar in that while polyarteritis nodosa may show an inflammation of the temporal arteries, "temporal arteritis" is also a nodular condition and may involve other arteries than the temporals. As well as the involvement of retinal vessels Horton and Magath (1937) report involvement of a branch of a radial artery, and in our first case the changes found in the arteries of the limbs may have been due to the arteritis. In this case the appearance of red blood-cells and hyaline and granular casts in the urine might suggest the possibility of involvement of the renal arterioles. An inflammation of the renal arterioles is a feature of many of the cases of polyarteritis nodosa, and its symptoms may closely mimic those of acute nephritis, as in the case quoted by

TABLE SHOWING FORMS OF ARTERITIS CONTRASTED

—	Thrombo-angiitis obliterans.	Polyarteritis nodosa.	Rheumatic arteritis.	"Temporal arteritis."
Clinical picture.	Intermittent claudication. Erythromelia. Loss of pulses. Trophic changes and gangrene in the extremities. Often some loss of weight.	Protean. Fever, tachycardia, sweating, loss of weight. Possible symptoms of renal involvement, of abdominal crises, or of other visceral infarctions. Liable to jaundice or to severe hæmorrhages. Polyneuritis. Muscular and joint pains. Liability to recrudescence. Anæmia, often with much leucocytosis and occasionally with eosinophilia.	That of the rheumatic disease.	Fever, sweating, loss of weight, general malaise. Anæmia. Pains in limbs. Very severe headache. Evident arteritis of temporal vessels.
Sex and age incidence.	Almost entirely males—usually young adults or middle-aged men.	Four times commoner in men than in women. Usually in young persons of average age of 30.	Both sexes; usually young persons.	Both sexes. Age over 60.
Type and situation of artery involved.	Usually in deep arteries. Disease affects chiefly arteries of limbs, but also those of viscera to a lesser extent. Typically an acute generalised disease.	Gross nodular lesions in medium-sized and small arteries of muscular type. Occasionally in large arteries. Widespread in visceral vessels. (Central nervous system in only 8 per cent.)	Small arteries, arterioles, capillaries, and vasa vasorum of aorta. Principally in visceral vessels, but much less widespread than polyarteritis nodosa. Lesions chiefly microscopical.	Other arteries besides temporals occasionally involved.
Nature of arterial reaction.	1. Acute stage: patchy lesions; media and adventitia invaded by polymorphs. 2. Chronic stage: much fibrosis in and around vessels; organisation of thrombi and recanalisation and proliferative endarteritis.	1. Acute stage: (*a*) severe medial necrosis, with fibrinous exudation; (*b*) infiltration of all coats with polymorphs, eosinophils, histiocytes, and lymphocytes. Much intimal proliferation. Liability to aneurysmal dilatation and rupture. 2. Granulation tissue in all coats. 3. Scar tissue replacement of arterial wall.	Coagulated fibrinous infiltration of all coats, particularly of the intima. Medial necrosis and occasional hæmorrhage into media. In some acute cases all coats are infiltrated with mononuclears and polymorphs and the intima is thickened.	1. Moderate medial necrosis with occasional hæmorrhage into wall. Round cell infiltration of adventitia. 2. Granulation tissue in all coats with giant cells in media. Intimal thickening and fibrosis.
Periarterial inflammation.	Fibrosis in later stages with matting of arteries, veins, and nerves.	Present in acute inflammatory stage, cellular in nature.	Present. Periarterial cellular and fibrillar stroma with capillary dilatation.	Present.
Thrombosis.	Present throughout disease.	Present from inflammatory stage onwards, causing visceral infarcts.	Nil.	Present.
Involvement of veins.	Phlebitis and periphlebitis both present.	Involvement of veins adjacent to inflamed arteries.	Nil.	Nil.
Progress of disease.	Tends to cause loss of limbs.	Usually fatal within a year. Death from emaciation, hæmorrhage, or infarction of heart or kidneys.	Vascularisation of involved arterial wall, especially in intima.	Some tendency to relapse. Apparent ultimate subsidence.

Arkin (1930). In Arkin's case there were no blood-pressure changes after four years, and yet in a few cases of renal polyarteritis nodosa the pressure changes are so great as to suggest malignant nephrosclerosis (Singer 1927, Friedberg and Gross 1934). Hypertension was present in two of Horton's cases and developed in another, but for the reasons just mentioned, and because of the age of these patients, it would be most unwise to assume that in them the high pressure was evidence of renal arteriolitis. The severe headaches that are a constant feature of all cases of "temporal arteritis" are thought by Horton and Magath to indicate inflammation of the cerebral arteries. If this is so, the term "temporal arteritis" becomes still more inadequate.

Horton and Magath have emphasised the fact that their cases all show recovery and this might be thought to separate this group from cases of polyarteritis nodosa. But Gruber (1925) quotes seven authorities who saw cases of polyarteritis nodosa that appeared to recover. Lindberg (1931) also described a case of recovery in a girl with symptoms as of subacute rheumatism and with superficial nodules of polyarteritis nodosa. He found that of 20 patients with polyarteritis nodosa with subcutaneous nodules about a third were presumably cured. Arkin, in the case of polyarteritis nodosa just quoted, found healing of lesions at the end of four years. This patient died of cardiac and renal failure; and diffuse scarring was found in heart, kidneys, and liver. The first case of temporal arteritis recorded by Horton and Magath (1932) died a similar death two years after the onset of an arteritis which never completely subsided. No autopsy was performed but the similarity is noteworthy.

In the present state of knowledge it is difficult to be sure that there may not be some similar cause in all the groups of arteritis mentioned. It may be that age in some way modifies the inflammation of polyarteritis nodosa, and that it is this modification which is found in temporal arteritis. The temporal arteries are, after all, the only really prominent arteries, and if they are spared during arterial inflammation, the nature of the illness may be entirely misunderstood. A subacute or chronic arteritis in other vessels may have been often overlooked.

SUMMARY

1. Two cases of subacute arteritis of the temporal arteries are described and compared with similar recorded cases.

2. A brief comparison is made of the abnormal and pathological features of polyarteritis nodosa, thrombo-angiitis obliterans, rheumatic arteritis, and "temporal arteritis."

3. A distinction between "temporal arteritis" and polyarteritis nodosa is not possible on clinical, and is difficult on pathological, grounds.

I wish to express my gratitude to Dr. Leslie Cole for permission to use the case notes and diagram. I am also very grateful to Prof. F. R. Fraser, Prof. J. H. Dible, and Dr. C. V. Harrison for help that they

have given me. I am indebted to the senior medical officer of the London County Council for permission to publish the notes of the first case.

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LEIOMYOMA OF THE STOMACH

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(WITH ILLUSTRATION ON PLATE)

LEIOMYOMATA, said by Boyd (1930) to be the commonest benign tumours of the stomach, receive scant attention in most text-books and are barely mentioned by Beattie and Dickson (1925), while Romanis and Mitchiner (1937) refer briefly to them and remark that they usually cause no symptoms whatever. Ewing (1928), however, quotes previously reported cases, and states that one led to severe hæmorrhage.

Further study of the articles on the subject suggests that the condition is commoner than is generally realised, and that symptoms requiring operation are not unusual. This is of considerable importance, for surgery offers a good prospect of recovery of normal health because most of these tumours are benign. Conway (1936) has made an exhaustive study of the bibliography, and states that 1·2–1·3 per cent. of all gastric neoplasms are benign. He was able to collect 56 recorded cases, and added two from his own experience. In his review it appears that plain muscle tumours are more commonly found in patients over 40 years of age. Some attain a large size—e.g., 5600 g. and 1560 g. They occur in any part of the stomach, and most retain a covering of gastric mucosa if they grow inwards, but they may also grow outwards and become covered by peritoneum. Three examples have been described recently by Denham (1936) in this country, and by Lindquist and Mock (1937) and Hartman and Camp (1937) in America. These three cases resemble ours in many respects, and the tumours were successfully removed.

FIG. I.—Radiogram of stomach showing appearance of tumour (Oct. 28th).

FIG. II.—Section of tumour.

CASE REPORT

A housewife, aged 59, was sent for consultation and gave a history of gradual loss of weight for about 9 months; for 2–3 months she suffered from nausea, intermittent vomiting, and epigastric pain; this was most severe about 1½ hours after meals and was relieved by food. Latterly epigastric discomfort was constant. She also stated that for many years "she has had to be careful of her diet." No melæna or hæmatemesis had ever been noted.

Examination revealed nothing more than an indefinite fullness in the epigastrium. The cachectic appearance usually associated with gastric carcinoma was lacking, and wasting was not severe. Fractional test-meal: complete achlorhydria; blood was present in all the specimens except one, and starch was absent in 2½ hours; no free acid in response to histamine injection.

Radiography (Dr. C. M. Rigby): A large filling defect was found, but the appearances were evidently unusual and a second screening again showed a large filling defect, but it was observed that peristalsis was little affected (Fig. I). On this ground, and because of the relatively good condition of the patient and the complete absence of evidence of metastasis, a benign condition was considered probable.

Operation (Nov. 8th, 1937).—On opening the abdomen the stomach was found to contain a mobile tumour about the size of a tennis ball. On further examination it was seen that the tumour was growing from, and had invaginated, the lesser curve at the junction of its upper and middle thirds. There was no fixation of the gastro-hepatic omentum, and no secondaries were evident in the regional glands or liver. The stomach was opened on its anterior surface and the tumour exposed. It was considered that the degree of mobility of the mass was strongly against malignancy, and as the patient was not a very suitable subject for a partial gastrectomy, the tumour and a small area of stomach were excised with the diathermy knife. The two incisions in the stomach were then closed. The patient made a good recovery and went home on Dec. 3rd.

Pathology.—The mass was ovoid in shape and measured 8·5 by 6·5 cm. and weighed 145 g. (Fig. II). Around its attachment to the stomach wall the gastric mucosa could be seen to be reflected on to the surface of the tumour. By far the larger part of the surface of the mass was, however, ulcerated. Congestion and hæmorrhage were obvious. Microscopically, apart from dilated blood-vessels, areas of hæmorrhage, and surface inflammation

the bulk of the tumour consisted of plain muscle; fibrous tissue was very scanty (Fig. III on Plate). The cells and their nuclei were blunt ended and stained brown by van Gieson's method. Mitoses were not numerous and the vessels were well formed. The tumour was therefore reported as being a leiomyoma with superficial ulceration and scattered areas of hæmorrhage.

DISCUSSION

Several points appear worthy of comment. This woman was in the cancer age, and her symptoms and the clinical findings at first glance suggested carcinoma. Had the mass been malignant, it would in all probability have been inoperable. It should perhaps be mentioned that a Bendien test (sodium vanadate method) performed on this woman's serum before operation gave a positive result. This was done not as routine but because the case was recognised as unusual. Whether the tumour removed will subsequently recur is a matter for speculation, especially as Lindquist and Mock in their paper remark that apparently benign leiomyomata may metastasise. The Bendien test is believed to be unreliable, but the finding is interesting. As the normal peristalsis observed in the stomach by X ray was also noticed in Denham's case and in that of Lindquist and Mock, the finding is evidently of diagnostic significance. Comparative healthiness in a patient showing a large gastric neoplasm should also suggest a benign lesion.

We wish to express our thanks to Dr. J. Menton, the county pathologist, for his help and advice, and to Mr. W. H. Fussell for his assistance in the preparation of the photomicrographs.

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SURGICAL TREATMENT OF BELL'S PALSY

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IN a previous communication (Morris 1936) I discussed in general the localisation of lesions of the VIIth nerve causing facial paralysis, and the modern methods of treating such paralysis, with special reference to the method devised by Duel and Ballance by grafting nerve from other sources to repair injury occurring especially during the operation of mastoidectomy. Since then I have had the opportunity of operating on a number of these cases, with encouraging results.

Recovery, according to Duel, can be expected up to a period of two years following the insertion of the graft. The first of my cases in this series was operated on in April, 1936, so I am not, at present, in a position to present a review of the results obtained so far. Suffice it to say that in some of the cases where there had been complete section of the nerve and a graft inserted, there is definite evidence of re-enervation of the facial muscles already. The purpose of this paper is rather to stress the importance of Duel's decompression operation in cases of Bell's palsy.

A paper read by Charles Bell before the Royal Society of London in 1821 described various experiments that he carried out, in which the facial nerve was severed in asses and dogs.

He states that "the animals so treated suffered no pain, but, on exertion, the side of the face on which

FIG. 1.—From cinematograph films taken (*a*) on day before decompression and (*b*) winking on affected side 6 weeks later.

the nerve was divided, did not move as did the other side." This led him to call the VIIth nerve the nerve of respiration of the face. He was criticised for this, but maintained his view by pointing out that muscles of the chest and shoulder were used when respiration became embarrassed, and brought these muscles also into the group of accessory respiratory muscles. It seems probable that he was unable to distinguish motor from sensory nerves, from his observations on section of the Vth nerve. He could, apparently, distinguish a supranuclear from an infranuclear lesion, and he describes cases of facial paralysis after fracture of the base of the skull and after operation on pre-auricular tumours and abscesses.

So, from this early beginning, the name "Bell's palsy" has been applied indiscriminately to infranuclear lesions of the nerve causing facial paralysis. From then onwards, although many cases were reported, no effort was made to ascertain the cause of the condition that we now call Bell's palsy, and to all practical purposes our knowledge of this has not advanced materially to-day. Hunter Tod defined Bell's palsy as facial paralysis following exposure of the face to abnormal heat or cold and unaccompanied by any evidence of middle-ear infection or deafness. Duel went further and described the condition as being due to congestion or inflammation of the nerve in the dense bony portion of the Fallopian aqueduct—i.e., in the portion between the horizontal canal of the labyrinth and the stylomastoid foramen. From what I have observed in the early cases on which I have operated, I am in no doubt that this is so. Exposure of the nerve in this portion, therefore, with consequent decompression, will relieve the pressure on the nerve-fibres and allow impulses to pass through unimpeded. The earlier this is done, the less danger will there be of permanent impairment of muscle function.

The choice of the cases in which this procedure should be carried out is not, however, a simple matter. We know that a great number of cases of Bell's palsy recover completely with the help of massage and electrical stimulation. In fact, until now, I think most aurists, having made the diagnosis, simply transferred the case to the department of physical medicine, feeling that they had done all that could be expected of them. If the case recovered, well and good. If the recovery were incomplete, it was

bad luck for the patient, but nothing more could be done. Partial recovery is the bugbear of these cases. In the past no surgeon would have cared to recommend a patient to risk what partial recovery there was for the uncertain result of anastomosis with the

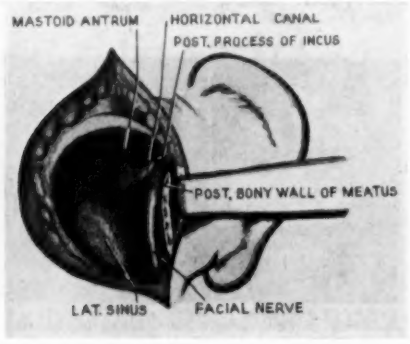

FIG. 2.—Appearance at operation, showing œdematous and inflamed exposed nerve (same case as Fig. 1).

spinal-accessory or hypoglossal nerves. The decompression operation obviates this risk. There is no reason why, if the decompression is carried out carefully, there should be any injury to the nerve at all, and the hearing will not be interfered with.

INDICATIONS FOR DECOMPRESSION

In which cases then should decompression be advised? In a series of twelve patients on whom I have operated in the past year I have found certain points that help to solve this problem.

The earliest case was in a girl aged 12, who had had complete right facial paralysis for six weeks with no return of voluntary movement. There was faradic response and the reaction of degeneration was not obtained. Fig. 1a and b is a "still" from a cinematograph record taken the day before operation. The notable features are the more widely open eye on the affected side, the watering of the eye, and the complete loss of movement when smiling. A simple decompression was carried out and the nerve was found to be œdematous and inflamed-looking, and bulged over the edges of the exposed canal (Fig. 2). On the day after the operation she could close the affected eye completely and in four weeks recovery was complete.

FIG. 3
From films taken (*a*) on day before decompression and (*b*, *c*) five weeks later.

The next earliest case was in a girl aged 17, who had complete paralysis of the right face for two months with no voluntary movement. The onset was accompanied by a spontaneous abscess of the nasal septum. The septal abscess was dealt with when she was first seen. After two months' observation I decided to decompress the nerve. Fig. 3 a is from a film taken the day before operation. Fig. 3 b and c were taken five weeks later.

Critics of the method have already asked "if these cases had been left alone and treated by massage, &c., would they not have recovered?" In my opinion, if they recovered at all they would not have made a complete recovery, and would have gone through life with obvious weakness of that side of the face which would have been apparent to everyone. It is my experience that the cases which are going to recover without treatment, other than massage and electrical stimulation, do so in from a few days to two or three weeks. At any rate at the end of this period there is very definite evidence of beginning recovery. If this is delayed as long as six weeks or more, it is my opinion that there is never complete recovery.

I have started, therefore, by taking six weeks as the limit of time for which I think a case should be treated expectantly. If at the end of six weeks there is no evidence, or very little, of recovery, I recommend the decompression operation, which offers the only hope of regaining a normal facial expression. Several of the cases under review were referred to me after months, and in two cases after years, of massage and electrical treatment. In all of them there had been partial recovery in the early stage, and then they had come to a standstill. In the earlier cases of this group, those with paralysis for from six months to two years, the nerve on exposure still appeared too large for the canal, and the process of recovery of muscle function was slow but quite definite.

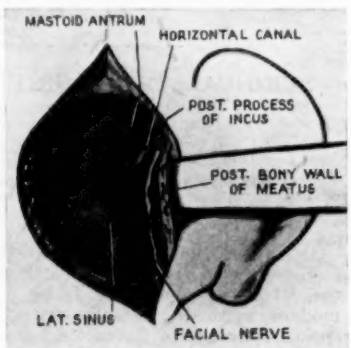

FIG. 4.—Condition of nerve after 8 years' palsy. Decompression followed by recovery.

The case with the longest history on which I have operated so far was a bilateral Bell's palsy of 8 years' duration. There had been very incomplete recovery for a year, but none after that. On exposure the nerve appeared as a white fibrous cord with a series of nodules in its course, which suggested small neuromata (Fig. 4). The nerve, in between these nodules, was thinner than normal. I incised the sheath, and it was obvious the next day that in so doing I had, either by damaging the existing fibres or by nerve shock, given the patient a complete paralysis again. After four weeks there was quite definite evidence of

recovery, and now, four months after the operation, the operated side is far in advance of the other.

ÆTIOLOGY

As regards the causation of Bell's palsy, I have made attempts, on incision of the sheath, to cultivate an organism, but without success so far. In 1932 Brain and Aitken at the London Hospital collected a series of patients with facial paralysis, which were

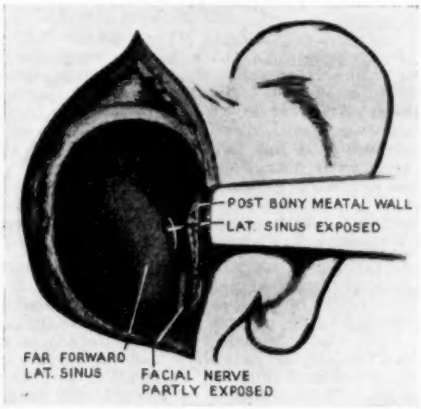

FIG. 5.—Appearance of lateral sinus in far-forward position.

then described as cases of Bell's palsy, and they endeavoured to prove that the paralysis was due to zoster infection of the geniculate ganglion. In their first group they describe cases in which there was an herpetic eruption of the skin of the meatus or concha supplied by the VIIth nerve. They say:—

"Netter and his colleagues have produced evidence that the serum of zoster convalescents contains a specific antibody whose presence can be detected by the complement-fixation reaction, using as antigen diluted zoster vesicle fluid. . . . The observations of Bedson and Bland . . . support Netter's claim. . . . Zoster may therefore be regarded as an infection with a specific virus, which leaves evidence of itself . . . in the form of antibodies in the serum, and if any cases of Bell's palsy are due to this virus the complement-fixation reaction should reveal evidence of this."

The term Bell's palsy is used rather loosely according to our ideas to-day. In their first group they obtained a positive result to the complement-fixation reaction in all cases in which an herpetic eruption had been observed. But they neglected to test the hearing of the patients and thereby lost a great opportunity of further localising the lesion, since if the geniculate ganglion were the site of the lesion the nerve to the stapedius muscle would have been involved and the air-conduction hearing impaired.

I am prepared, however, to accept the cases in this first group as those of zoster infection of the ganglion, and as such they should not be included under the heading of Bell's palsy. In their second group, where no skin eruption was observed, they invariably failed to obtain a positive complement-fixation reaction. Here, again, no hearing test was carried out, but in my opinion the cases in this latter group can safely be designated Bell's palsy according to the modern conception of the condition.

A purely technical difficulty that I have had is with the occasional far-forward position of the lateral sinus. Normally this should be about ¾ in. posterior to the posterior bony meatal wall. It is common knowledge that its position may vary within wide limits. Occasionally I have found it close up to the meatal wall with the mastoid antrum deep to it and quite inaccessible without sacrificing the sinus. It is my experience that this commonly occurs in the dolichocephalic type of skull and when there is a long history of middle-ear suppuration. In this latter class the mastoid process has become sclerosed and consists of solid bone, and commonly the sinus is abnormally far forward. The exposure of the nerve in these cases is a problem and it is one that I have not as yet solved. In the series under review I have met with two cases, the first of which I have tried to illustrate in Fig. 5.

In two other patients in the series, X ray examination showed a cellular mastoid process on the unaffected side and a sclerosed process on the affected side.

CONCLUSIONS

At present I regard a period of six weeks to two months as the limit of time a case of Bell's palsy should be treated expectantly, when there is no evidence of voluntary movement of the facial muscles. If faradic response is lost, or the reaction of degeneration can be obtained before this, the sooner decompression of the nerve is carried out the more chance has the patient of complete recovery.

Where a paralysis has been treated expectantly with some recovery, and then come to a standstill, further improvement may be anticipated by decompression and, in the longer cases, introduction of an "inlaid graft," which by chemotaxis will stimulate the existing active fibres of the nerve.

Further than this I am not prepared to go at present, but it is, I think, common ground that in no case should the operation be attempted where the presence of muscle tissue cannot be demonstrated.

In the series under review, the earliest case operated on was of 6 weeks' duration without any demonstrable recovery. In the patient with the longest paralysis it was of 8 years' duration. In only one patient in the series has there been no evidence of improvement after simple decompression, and in this I was uncertain of the diagnosis at the time I examined her. She had a history of facial "tic," resulting in facial paralysis, and I mention her only because she was operated on in the series. [Since writing this, I have had an opportunity of seeing this patient again after an interval of three months. She is now recovering rapidly, especially in the lower division.]

It is therefore true to say that in all the cases in this series there has been recovery, complete in the early ones and partial, at the time of writing, in the long-standing ones.

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HOSPITALS DAY.—Last year at the suggestion of the Commissioner of Police of the metropolis 108 hospitals in Greater London agreed to unite their many flag-days and street collections in one effort. The total sum collected was over £32,500, which is more than these hospitals formerly derived from their individual flag-days. This year 135 hospitals are coöperating. The general hospitals in inner London will hold their day on Tuesday, May 10th; the general hospitals in outer London on Saturday, May 14th; and the special hospitals on Tuesday, Oct. 11th. The central committee for the collections may be addressed at 36, Kingsway, London, W.C.2.

THE ACTION OF CURARINE ON RESPIRATION

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In recent years there have been a number of reports of the use of curares and their derivatives, especially curarine, in the treatment of chronic muscular rigidities of pyramidal and extrapyramidal origin, and in the treatment of acute tetanus (West 1932, 1935, Cole 1934, 1935a, Mitchell 1935). In 1936 in a paper on the use of intravenous curarine I recorded bronchial spasm as a danger to the patient (West 1936). This spasm may come on very suddenly, and is independent of the presence of tetanus, for it occurred in a case of parkinsonian rigidity. Its danger is moreover not limited to curarine; I have seen respiratory embarrassment, which I believe to have been of the same type, in a patient with spastic paraplegia who had been given an extract of a calabash curare subcutaneously.

The clinical picture of curarine respiratory spasm is a peculiar one. The patient referred to above was partially, but by no means fully, curarised when it developed, and this is characteristic. She had complained of drooping of the eyelids, mistiness of vision, and difficulty in raising her head from the pillow. These are early signs of curarisation. But her spasticity had not fully relaxed, and at the onset of the spasm she had considerable, though diminished, power in her arms and legs. On being sat up she had diplopia lasting ten minutes. No further weakness appeared. The patient described her sudden difficulty of breathing: "as if I had to make a great effort to draw in a breath or I would be unable to breathe again." The dyspnœa is inspiratory, the chest remaining in full expiration between short effortful breaths in which the accessory respiratory muscles are used.

In a case of very severe tetanus seen in 1937 curarine was given by slow intravenous inflow with a Henry and Jouvelet transfusion pump. A maximum of 600 c.cm. of fluid was given in each six-hour period, and each 600 c.cm. contained 100 mg. of curarine and 1/50th grain atropine. Generalised spasms, which had been increasing in severity and frequency during the four hours before curarisation, were held in abeyance for seventeen hours, and the patient remained curarised sufficiently to relax the jaw during most of that period. Subsequently, as in other cases, the tetanus spasms began to appear despite the curarisation, and rapid deterioration with cyanosis and cardiac failure took place. During the last hours of the patient's life curarisation was first stopped, and then, after one or two severe convulsions, deepened. It was after this that a respiratory spasm occurred as to the cause of which I was uncertain. It was sudden; the chest remained in expiration. Oxygen was given in an increasingly strong stream through an endotracheal catheter, but there was very little change in the deep cyanosis, although the heart continued to beat strongly for some minutes. At the autopsy the lungs were found to be massively collapsed. Oxygen had penetrated the tracheal walls and caused subcutaneous emphysema of the areolar tissue round the root of the lung, and of the neck, face, posterior abdominal wall, and scrotum, although no puncture caused by the catheter could be found and there was no sign of a positive pressure in the thoracic cavity itself.

Curarine bronchial spasm had been suspected from animal experiments (West 1935), but had only been found in the perfused tracheal ring of rabbits and cats when curarine was present in quite disproportionately high concentrations (West 1937). Obtained thus, however, it was removed by adrenaline, suggesting that the action might be of the histamine type. Since seeing the case of tetanus recorded above, I have made further experiments in animals (West 1938), and these throw more light on this dangerous action of curarine. They may be briefly summarised as follows:—

(1) In guinea-pigs, which were chosen for their known bronchial sensitivity to histamine, curarine produces retraction, blanching, and diminished expansion of the exposed lungs in the pithed animal. The lungs were ventilated by internal inflation and the pressure required for distension noted. The effects were seen with dosage comparable with that given to man (0·1 mg. per kg.), and were antagonised by adrenaline. Curarine can thus exert a direct action on the lung, which resembles (but is not identical with) histamine bronchoconstriction.

(2) Curarine in dosage of this sort has also a curariform action, from which the respiratory muscles are not exempt. The diaphragm becomes weakened, losing both its tone and its power of contraction, and rises into the thoracic cavity. Radiograms of curarised rabbits and cats show that the chest volume is diminished not only on inspiration but also in expiration. Measurements of intrapleural pressures show that the normal "negative" pressure is almost or quite abolished under these conditions—an effect particularly noticeable in horizontal or inverted postures, when the abdominal viscera can press upon the flabby diaphragm.

(3) The fall in the negative pressure which normally assists the distension of the lung may be expected to increase the effect of bronchoconstriction when this occurs. For normally this negative intrapleural pressure acts as a bronchodilator when the lung is at rest, and still more so during inspiration.

The effect of these combined factors in curarine poisoning is well shown in the following observation. A curarised cat cannot be artificially respired by the method of chest compression in the horizontal posture, at a time when air will enter the lungs freely after such compression in the vertical (head-up) posture. This is due to an inability to secure an adequate negative intrapleural pressure except with the traction on the diaphragm produced by the vertical posture. In control experiments very similar pressure variations may be produced by arrest of respiration by an overdose of ether in a cat under chloralose anæsthesia. But in that case artificial respiration can still be performed, for the direct bronchoconstrictor action is absent.

The same mechanism doubtless applies to man. A patient with progressively weakening inspiratory power, and an intrapleural negative pressure which is falling, is not in a condition to resist the action of a bronchoconstrictor drug. It is presumably because of the partial curarisation that these particular attacks of dyspnœa are inspiratory, in contrast with the usual appearance of a distended chest which asthma and histamine spasm produce. There is experimental evidence that adrenaline might remove the attack, and that atropine in large doses might prevent it. But curarine respiratory spasm may be so catastrophically sudden in its onset as to render remedial measures useless. From my own experiences with this alkaloid, I do not think it can be made of aid to cases of chronic pathological rigidities in dosage which is safe. Further, I gravely doubt if

in its present form curarine can be made a practicable remedy for cases of acute tetanus that are inaccessible to recent remedies such as Avertin anæsthesia (Lawen 1928, Lindemann 1929, Momberg and Rotthaus 1929, Cole 1935b).

Finally, it may be noted that there has been increasing reason to regard curarine as being not a pure alkaloid but a mixture. Whether produced from calabash curare or direct from *Strychnos toxifera* it has failed to crystallise (King 1935). Quite recently a more powerful curarising alkaloid (Toxiferin) has been crystallised from calabash curare, though not as yet from *S. toxifera* (Wieland 1937). If the direct bronchoconstrictor action of curarine should be due to an impurity, the absence of this from toxiferin might possibly give the latter a place in therapeutics which we must deny to curarine.

SUMMARY

Curarine and some curares may produce a dangerous respiratory spasm. Sudden inspiratory dyspnœa occurs, breathing may be arrested, and difficulty of artificial respiration by chest compression and by endotracheal oxygenation suggested the presence of bronchial spasm. In a case of acute tetanus treated with curarine collapse of the lungs was found at autopsy.

Animal experiments show that curarine can in fact exert a direct constrictor action on the bronchi, and that the effects of this are increased by partial curarisation of the respiratory muscles. Not only is the partly curarised diaphragm weakened in its inspiratory contraction, but its resting tone falls; it rises into the chest cavity, and, in consequence, the "negative" intrapleural pressure falls. The result is a reduction of the bronchodilator action of the normal distributions of pressure within the chest cavity, in expiration and in inspiration.

Curarine is probably not a pure substance (King). A purely curarising alkaloid—perhaps to be found in "toxiferin" (Wieland)—by lacking the direct bronchoconstrictor action might increase a margin of safety in curare therapy, which in the case of curarine is too small to justify its employment.

I am indebted to Dr. Purdon Martin for permission to see the case of tetanus mentioned in the text, and to Dr. J. G. Greenfield for the autopsy.

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CLINICAL AND LABORATORY NOTES

CHRONIC DUODENAL ULCER IN A CHILD OF SIX YEARS

WITH FATAL HÆMORRHAGE AFTER APPENDICECTOMY

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A BOY aged six was admitted to the Cardiff Royal Infirmary on Oct. 3rd, 1937, complaining of upper abdominal pain, vomiting, and constipation of about 24 hours' duration.

On four occasions during the previous two years the child had had attacks of vomiting associated with sore-throat and fever. There was no abdominal pain, hæmatemesis, or melæna during these attacks and, with the administration of alkalis and glucose, they subsided in two or three days. On admission the child looked ill, the temperature was 103° F., the pulse-rate was 120 per minute, and the tongue was coated. The abdomen was tender in the region of the right iliac fossa but there was no rigidity.

At *operation* acute appendicitis was found and appendicectomy performed. The appendix contained two stercoliths, one of which had ulcerated almost through its wall, and, in addition to an acute suppuration, there was histological evidence of a chronic inflammation.

During the first two days after operation the temperature returned to normal and the general condition improved. On the third day the temperature rose to 99·7° F., the pulse became poor, and the child grew restless. During the early morning of the fifth day he vomited altered blood and passed tarry stools, the pulse becoming feeble and rapid. Hæmoplastin and horse serum were administered and a blood transfusion was given. On the sixth day he collapsed, vomited bright red blood, and shortly afterwards died.

Post mortem a chronic peptic ulcer was found on the posterior wall of the duodenum 9 mm. beyond the pylorus. It had penetrated the entire thickness of the gut and eroded the gastroduodenal artery causing hæmorrhage. The ulcer was oval in outline, measuring 15 by 9 mm., and its sides were funnel-shaped but there was some overhanging of the mucosa. The floor was formed by the pancreas. In the region of the ulcer there was induration of the tissues and the duodenum was firmly adherent to the pancreas. Microscopic examination showed a moderate degree of fibrosis indicating an ulceration of some standing. The stomach contained a large quantity of blood clot and there was much altered blood in the intestines. In the region of the cæcum were many recently formed fibrinous adhesions and amongst them a small abscess. The omentum, which was lying in the upper abdomen, was not adherent to any of the structures, but it contained a small abscess in its folds. The tonsils were somewhat enlarged; the remaining organs were pale but otherwise normal.

Stewart believes that the process of peptic ulceration from its onset to the time of complete perforation of the muscular coat occupies at least two months (Hurst and Stewart 1929). In the case here described the presence of firm adhesions and some fibrotic induration of the parts, in addition to complete perforation, suggests a process of somewhat longer duration. Before the hæmatemesis occurred there were no definite signs of peptic ulcer; the attacks of vomiting described in the history may have been referable to the chronic appendicitis.

Ulcer of the stomach and duodenum in infants and children has often been recorded, but the ulcers have seldom been of the chronic peptic type. Proctor (1925) found records of only 19 undoubted cases in the first fourteen years of life. In 3 of these (one male) the ulcers were duodenal; in 5 (all female) the position of the ulcer was not stated. Proctor also analysed 6664 cases of chronic duodenal ulcer observed at the Mayo Clinic from 1906 to 1924 and

he found only 2 in children under fourteen years of age, 1 of which was not confirmed by autopsy. Hurst and Stewart (1929) in 200 cases of chronic peptic ulcer found none in the first decade of life and only 8 in the second. Miller and Gage (1930) report a case of chronic cicatrising duodenal ulcer in a girl of seven. Bloch, Bronstein, and Serby (1932) describe 4 cases of chronic duodenal ulcer, diagnosed by radiography, in 3 girls aged respectively five, nine, and eleven and 1 in a boy aged thirteen. Smyth, Crymble, and Allen (1934) record a case in a girl of ten.

Moynihan (1920) considered that the symptoms of chronic peptic ulcer could often be traced back to the age of ten years or earlier and Barford agrees with this. Proctor examined 1000 cases of duodenal ulcer seen at the Mayo Clinic and found 26 with symptoms dating back to childhood. He suggests that this condition may be commoner in the earlier years of life than is generally supposed.

I am much indebted to Prof. Lambert Rogers and Dr. Gordon Jones for supplying me with the clinical history.

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POST-PARTUM MACROCYTIC ANÆMIA ASSOCIATED WITH CONFUSIONAL STATES

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DEPUTY MEDICAL SUPERINTENDENT AND PATHOLOGIST TO THE PARK PREWETT MENTAL HOSPITAL

THE form of mental disorder occurring in pernicious anæmia varies from mere alteration of character or disposition to more or less paranoid, manic, depressive, or confusional reactions. A delirium with unpleasant hallucinations is recognised as being one of the commonest types, and is illustrated by the first of the two cases here reported.

FIRST CASE

A married woman aged 38 was admitted on a temporary basis on June 9th, 1937. There was a history of pregnancy toxæmia with a blood pressure of 208 mm. Hg and albuminuria. Labour had been surgically induced and a stillborn infant of 30 weeks was delivered on June 5th. She had aural hallucinations on the 8th, complaining that other patients were whispering against her; green lights worried her. She became very distracted and noisy. No family history of insanity. Previous history: Four pregnancies without toxæmia.

On admission she was confused, amnesic, and disorientated. She was greatly frightened by unpleasant aural and visual hallucinations. She saw her husband being put into a sack and burned alive and then heard his voice from beneath the mattress. She was very distressed, aimlessly restless, and frequently shouted for the police. The relevant physical findings were: Very pale skin; radial artery thickened; heart-rate, 120; blood pressure, 130/90 mm. Hg; albumin and granular casts in urine; no signs of involvement of the central nervous system.

Blood count:

Red cells ..	1,656,000	White cells ..	10,630
Hæmoglobin ..	38%	Polymorphs ..	85%
Colour-index ..	1·15	Arneth index ..	2·73

Reticulocytes, 16 per cent.; polychromasia, severe microcytosis, macrocytosis, and poikilocytosis; normablasts present.

Blood: Kahn and Meinicke negative. Fragility of red cells: in 0·38 per cent. saline. Pyrexia on one day only (99·4° F. on the 12th). The patient was put on mist. ferri et ammon. cit., gr. 30 t.i.d., and intramuscular injections of 2 c.cm. Hepol daily.

Progress.—June 14th: No longer hallucinated, but somewhat perplexed by her past experiences; generally retarded and had no clear idea of time; lay quietly in bed. 16th: Red cells 2,341,00, hæmoglobin 44 per cent., and colour-index 0·98; reticulocyte crisis of 37 per cent. 23rd: Red cells 3,458,000, hæmoglobin 68 per cent., and colour-index 0·98; reticulocytes 1·6 per cent.; she had gained insight, and remained lucid and calm; occupied herself. July 14th: Injections of hepol reduced to alternate days. 19th: Red cells 4,265,000, hæmoglobin 82 per cent., and colour-index 0·96. She was discharged as recovered on July 21st.

SECOND CASE

A married woman aged 40 was admitted on a certified basis on Jan. 22nd, 1937. There was a history of full-time parturition on Dec. 1st, and the patient is reported to have become rambling and disconnected in her talk a week later. Previous history: Two uneventful pregnancies. No insanity in family.

On admission she was confused, took no notice of what was said to her, and was aimlessly restless. She muttered disconnectedly to herself, had to be hand-fed, and her habits were faulty. The relevant physical findings were: Icteroid tinge of skin; blood pressure 85/50 mm. Hg; no involvement of the central nervous system; several septic areas on right hand and foot.

Blood count:

Red cells ..	2,083,000	White cells ..	5750
Hæmoglobin ..	45%	Polymorphs ..	69%
Colour-index ..	1·08	Arneth index ..	2·48

Reticulocytes, 0·53 per cent.; severe microcytosis, macrocytosis, and poikilocytosis; normoblasts present; polychromasia.

Blood: Kahn and Meinicke negative.

Progress.—Jan. 25th to Feb. 5th: 2 c.cm. hepol intramuscularly daily. Jan. 31st: Red cells 2,600,000; reticulocyte crisis of 9 per cent. Feb. 6th: No mental improvement; remained noisy, confused, difficult with food, faulty in habits; red cells 2,558,000; reticulocytes 1·8 per cent. Hepastab 2 c.cm. intramuscularly daily, until the 17th. Feb. 9th: Red cells 2,664,000; reticulocyte crisis of 7·8 per cent. 15th: Put on mist. ferri et ammon. cit., gr. 20 t.i.d. On the 16th she developed erysipelas of the face; temperature 103° F., pulse-rate 140, respirations 28. 17th: Red cells 2,576,000; reticulocytes 0·58 per cent.; she remained restless, noisy, and excited. On the 20th she was isolated as a diphtheria carrier; inoculated with 0·5 c.cm. alum-precipitated toxoid. On the 28th she developed broncho-pneumonia, and on March 11th left femoral thrombosis, with considerable œdema of left lower extremity. A right parotitis began on March 14th, but by April 4th both lung and parotid conditions had cleared. She was still restless, noisy, and confused; red cells 2,300,000, hæmoglobin 48 per cent., and colour-index 1·04. April 6th: Given ½ lb. liver daily, and from the 23rd to 28th, intramuscular injections of liver extract (Ferris). May 25th: Red cells 3,958,000, hæmoglobin 73 per cent., and colour-index 0·92; she was no longer excited or noisy; still confused, but beginning to employ herself. June 28th: Red cells 4,575,000, hæmoglobin 85 per cent., and colour-index 0·92; mental improvement continued. Could occasionally answer relevantly, but was not clear about time and had some amnesia; occupied herself very usefully. On July 20th tonsillectomy was performed to cure the carrier condition and she was discharged recovered on Oct. 4th, after four weeks absence on trial.

In these days of a returning belief to synergic ætiology—a phrase I borrow from Crichton-Miller [1]—I would not advance that the anæmia in these two cases was the sole causative factor. Other causes—psychological, a certain degree of infection, and pregnancy toxæmia in the first patient—cannot be accurately evaluated, but it is noteworthy that in

[1] Crichton-Miller, H. (1937) *Brit. J. med. Psychol.* **16**, 171.

the second patient the mental improvement ran closely parallel with a return to a normal blood condition. Another interesting feature of this case is the delay in the beneficent reaction to liver therapy because of continued infection of one sort or another.

I wish to thank Dr. V. L. Connolly, the medical superintendent, for permission to publish these reports.

EVIPAN SODIUM IN THE TREATMENT OF TETANUS

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The use of Evipan Sodium in the treatment of tetanus has already been described by Heard (1934), Hoche (1935), and Walzel (1935), but as the total number of cases so treated is only 19 a further report may be of interest. Thanks to intensive cultivation of the soil, ignorance of the potential danger of soiled wounds, and reluctance to go to hospital, tetanus is frequently seen in Barbados, often in advanced stages.

I have found chloroform unsatisfactory, both for stopping convulsions and as an anæsthetic for antitoxin injections, enemata, and the cleansing of infected wounds. Moreover its administration requires a skilled assistant. The advantage of evipan sodium is that after giving the injection the surgeon is free to perform the necessary local and specific treatment and needs only semi-skilled assistance.

The injection is given in the normal manner, but the needle is inserted above the fold of the elbow, in case the stimulus should provoke a convulsion and flexion of the arms. In 5 of my 6 cases 10 c.cm. (= 1 gramme) of evipan sodium was given, in disregard of the weight, age, and condition formula suggested by Specht (1933); the other patient, a child of four, received 4 c.cm.

Antitetanic serum may be injected intravenously through the same needle, left in position for the purpose. The patient is then rolled over and the intrathecal dose of antitetanic serum given. Septic wounds can now be cleaned, suspicious puncture wounds opened up, and eusol dressings applied or changed.

After a dose of 1 g. of evipan sodium the patient usually continues to sleep, or at least remains drowsy, for two or three hours. As the sleep becomes lighter, chloretone (40 grains dissolved in an ounce of olive oil) may be given per rectum, and this usually prolongs the drowsiness for the rest of the day. The first evipan injection is given immediately after admission to the wards; on subsequent days it is given in the morning so that the combined action of evipan sodium and the chloretone may exert their effect throughout the day. In severe cases of tetanus it is possible that the attacks may recur later in the day, after the combined effect of the evipan sodium and chloretone has worn off. I myself have not seen such cases, but Walzel describes five, two of which were given a further injection of evipan sodium which controlled the attack.

I have not found it necessary to continue administration of evipan sodium for more than three days. Occasionally it may cause mild excitement at night. This is readily controlled by giving morphia, as recommended by Haller (1936) and McNelis (1936). In my experience the injection does not provoke a tetanic attack.

I am indebted to Dr. H. G. Massiah, visiting surgeon to the Barbados General Hospital, for permission to investigate the cases.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS AND PHARMACOLOGY

This section met on Feb. 8th with Dr. J. W. Trevan, the president, in the chair.

Sex Hormones in the Urine

Mr. R. K. Callow, D.Phil., read a paper on the significance of the excretion of sex hormones in the urine. He pointed out the error of the impression often gained that recognition of hormone activity in the urine and subsequent isolation of active compounds constituted identification of the primary hormones. A distinction must be drawn between the compounds whose presence had been proved in the endocrine glands and those modified compounds excreted in the urine which might or might not retain some part of the original activity. Œstrogens in the urine were derived from the known active compound in ovaries by a process of oxidation. Progesterone, isolated from corpora lutea, appeared to be reduced and completely inactivated when excreted. Testosterone, the only male hormone extracted from testes, was not isolated from urine: the known urinary androgens were compounds which could be derived from testosterone by a combination of oxidation and reduction, and one of them, at least —namely, dehydro-androsterone—was more probably derived from the adrenal. The adrenal glands contained a family of compounds chemically related both to the androgens and to progesterone. Considering the close chemical relation of all these compounds derived from the ovary, placenta, testis, and adrenal, it was not surprising that various hormonal activities could be detected in extracts from any one gland, and the problem of assigning a source to an excreted product was not simple.

A further test of the significance of excreted hormone activity was to examine the excretion when hormones were administered. The number of organs and processes which might be involved in the metabolism of hormones was such that examination of the urinary waste-products alone gave information about only one of many variables. Experimentally, œstrin activity had been recovered only to the extent of 3–12 per cent. Administered progesterone was recovered in the urine as the inactive compound pregnanediol in amounts equivalent to 12–46 per cent. of the hormone given. From investigations by Dr. Callow and his collaborators it appeared that moderate amounts of administered male hormones were destroyed completely by the body, and only after large doses was an increase perceptible in the androgen activity recoverable from the urine.

Yet another set of facts complicating the problem was the excretion of "male" and "female" hormones by both sexes. Early views of the sexual specificity of hormones had been modified, since the occurrence of œstrus-producing hormone in male blood had been accepted reluctantly and even

interpreted as evidence of a physical basis of homosexuality. It was now recognised that œstrogens were excreted by men of undoubted virility and œstrone occurred in the urine of stallions in amount sufficient for isolation. The assay of androgens in urine, investigated by Dr. Callow and his co-workers, had given results bearing directly on this subject. The methods of extracting urine had been investigated, and the method of assay by measuring comb-growth in capons had been supplemented by a chemical method based on a colour reaction which was both rapid and sensitive and gave results consistent with the other method. Whilst normal men excreted on the average more androgen than normal women, the limits for the two sexes overlapped widely. The amounts excreted by ovariectomised women, eunuchoids, and, particularly, eunuchs, precluded any correlation of androgen excretion with sexual condition. In cases of Addison's disease the androgen excretion was low. A relation of androgen excretion to adrenal function was shown strikingly in certain cases of a series of hirsute women. In many of these the correlation of hirsutism with androgen excretion was irregular, but adrenal hyperplasia was associated with high values, in agreement with other workers' results, and in cases of adrenal tumour the androgen excretion was very large indeed, and chemical investigation had led to the isolation of the androgenic compound dehydro-androsterone, which was regarded on this account as a product of the adrenal.

Apart from circumstances in which the body was flooded with an excess of hormone, as in pregnancy or with certain tumours, the assay of sex hormones was an uncertain aid to diagnosis. Correlation with normal physiological processes must first be justified empirically, and it was not yet permissible to argue too freely from observed excretion to diagnosis of physiological condition. R. T. Frank had said that studies of hormone excretion in the menstrual cycle, though they served as valuable aids, could not replace clinical acumen and experience. Dr. Callow hoped that chemists and biochemists might yet be able to improve this position.

Dr. LEVY SIMPSON said that males and females both excreted "male" comb-growth and "female" œstrogenic hormones in about equal quantities. It had occurred to him in 1933 that a virile woman might have an increased excretion of "male" hormone, and in testing this hypothesis he had been lucky enough to choose a woman who did. He had thought that the source of the "male" hormone might be the ovary, adrenals, or pituitary; but he had no knowledge of the pituitary producing such a hormone, and the excretion had been found in an ovariectomised woman. A series of investigations with collaborators, and especially the fundamental work of Callow, supported the hypothesis that the adrenal gland was responsible. If excretion was a measure of secretion, it was hard to see why only some virile women excreted an excess of "male" comb-growth hormone; but it probably was not. Adrenal tumours produced feminism in a male and virilism in a female, the male excreting a considerable excess of œstrogenic hormone and the female a considerable excess of "male" comb-growth hormone; but the histology of the adrenal had hitherto been thought to be the same. At his request, Dr. Joan Ross had compared the histology of the adrenal gland tumours of a virile woman and a feminised man, who had excreted excess of comb-growth and œstrogenic hormones respectively. She found certain discrete granules in the adrenal tumour of the woman, but not in that of the man. This seemed to fit in with her study of normal adrenal glands, in which such granules appeared in the inner zone of the cortex at and after puberty in males, but not till the age of 50 in females. As an alternative to a histological basis for the different secretions, it was possible that the ovary converted an adrenal hormone into one type, the testis into another. If the excretion of comb-growth hormone exceeded 300 units per day, a thorough search for an adrenal tumour must be made, and even laparotomy was justified. Unfortunately, a patient with adrenal hyperplasia might show an excretion up to 300 units, but such high values were uncommon.

Mr. F. LL. WARREN thought the stallion should be remembered as a warning that the type of hormone in the urine was not necessarily an indication of the type of individual. Experiments on mice had shown that ovaries grafted into the ears of castrated male animals could maintain secondary sex growth; there was no inherent difficulty in accepting that one tissue could produce both androgens and œstrogens. He wished that when an adrenal cortical tumour was diagnosed the clinician in charge of the case could be put in touch with those working on these hormones.

Dr. A. C. CROOKE had found that in some cases of virilism there appeared to be some relation between the amount of male hormone excreted and the length of history of amenorrhœa.

Mr. A. S. PARKES, F.R.S., spoke of the relation of waste products to hormones. There was some evidence that all hormones had been excreted at some stage in evolution; for instance, the lactation hormone was present in the pituitary of birds which presumably had no use for it: the waste product of to-day was the hormone of to-morrow.

Dr. A. T. M. WILSON pointed out that the observations recorded lent weight to the view that anatomical and functional sexuality were not identical.

ASSOCIATION OF CLINICAL PATHOLOGISTS

THE eleventh annual scientific meeting of this association was held at St. George's Hospital, London, on Jan. 29th, the chair being taken by Dr. JOHN BOYCOTT.

Blood Fragility Tests

Dr. E. FF. CREED described his technique for estimating the fragility of red blood corpuscles. He found the simplest method of ensuring accuracy in the strength of the sodium chloride solutions was to make up a permanent 25 per cent. stock solution, and prepare dilutions of this when required, using a dropping technique for the final stages. He estimated the amount of hæmolysis at each dilution by matching against colour standards, and plotted the results as a curve. He emphasised the effect of the venosity of the blood on fragility, and showed how this cause of decrepancy could be eliminated by aeration of the blood before testing. He preferred to use fresh untreated blood so as to avoid risk of altering the fragility by any preliminary treatment, and so as to retain the buffering effect of the plasma. He thought that the increased fragility, said to be found in some cases of acholuric jaundice only after washing, was possibly due to increased liability to *p*H changes in the absence of plasma. Dr. Creed also emphasised the importance of taking into account the degree of anæmia when interpreting fragility results, as the corpuscles of anæmic blood show an increased resistance to hypotonic saline. He demonstrated how

the fragility curve tailed off at each end, and how unsatisfactory was the common form of report, that hæmolysis begins and ends at certain dilutions. He suggested that results should be recorded either as a curve or as the dilutions at which given percentages of corpuscles are hæmolysed. He showed the narrow limits within which fragility curves normally fell and the extreme constancy found in single individuals over long periods.

Dr. R. G. BANNERMAN described a case of hæmolytic anæmia in a man of 60 who gave no family history of anæmia. He complained of muscular weakness and intermittent jaundice. Attempts to make an accurate blood count were frustrated by rapid auto-agglutination in spite of anticoagulants, but estimates of about a million red blood-cells and a high colour-index were made. There was a great excess of reticulocytes. Liver treatment and blood transfusion being ineffective, splenectomy was carried out, but the patient died shortly after.

Dr. C. J. YOUNG drew attention to the fact that splenectomy was not always successful in the treatment of acholuric jaundice. He described a patient with a hæmolytic crisis in whom splenectomy and transfusions failed to arrest the hæmolysis. After the removal of a degenerating ovarian teratoma she completely recovered. It was suggested that the hæmolysis was directly or indirectly related to a toxæmia originating in the ovarian tumour, although this could not be the only factor in its causation. He discussed the position of splenectomy in acholuric jaundice and summarised some of the published evidence that toxæmia was one of the factors in the production of hæmolytic crises. He also pointed out that although splenectomy had been recommended to prevent the occurrence of these crises, it was clear from recorded cases that it could not be guaranteed to do so.

Level of Plasma Bilirubin

Dr. JANET VAUGHAN described observations made in collaboration with Mr. G. A. D. Haslewood on the level of plasma bilirubin in normal and pathological subjects. The values found in 100 healthy men and women, using the method of Haslewood and King (1937), had varied between 0·2 and 1·7 mg. per 100 c.cm., 93 per cent. of the figures falling between 0·2 and 0·8 mg. The high figures had been all present in men. She concluded that there was no justification in excluding such figures as previous workers had done and suggested that until further work was available levels varying between 0·0 and 1·3 mg. per 100 c.cm. should be considered as probably normal, while figures between 1·3 and 1·7 mg. should be regarded as probably, but not necessarily, pathological. In 15 cases of typical Addisonian pernicious anæmia with red cell counts below 3,500,000 per c.mm. only 3 had been found to have a plasma bilirubin above 1·1 mg. per 100 c.cm.; the average figure being 0·93 mg.—well within normal limits. She suggested that this divergence from accepted teaching was due to the fact that patients with Addisonian pernicious anæmia now received treatment in an early stage of the disease before unutilised pigment had time to accumulate. She believed that there was no essential difference in pigment metabolism between Addisonian pernicious anæmia and other megalocytic hyperchromic anæmias reacting to liver, as had previously been believed. In 9 examples of hypochromic anæmias in middle-aged women she had found an average plasma bilirubin of 0·15 mg. per 100 c.cm. with a range of 0–13·0 mg. In 7 patients with acholuric jaundice before splenectomy the range had been 0·7–2·3 mg. per 100 c.cm. After splenectomy it always became normal. Dr. Vaughan suggested in conclusion that the level of plasma bilirubin was not necessarily a true indicator of the character of metabolism of blood pigment, just as the level of serum calcium was not always a true indicator of the normality of calcium metabolism.

Hypochromic Anæmia in Infancy

Dr. H. W. FULLERTON discussed the rôle of maternal iron deficiency in the ætiology of the hypochromic anæmia of infancy. Analysis of the hæmoglobin levels of 167 mothers and their infants, aged 9–16 months, revealed no significant correlation between maternal anæmia and anæmia in the offspring. The finding, therefore, did not support the view generally held, that the infants of mothers suffering from iron deficiency have a normal hæmoglobin level at birth but develop hypochromic anæmia towards the end of the first year of life owing to deficiency in iron stores in the liver at birth. A quantitative study revealed that even complete absence of liver stores of iron at birth could produce only a mild degree of anæmia in the infant after nine months. It was concluded that low birth weight was a much more important factor in the development of hypochromic anæmia in infancy.

Obscure Macrocytic Anæmia

Dr. FULLERTON also described 3 cases of severe macrocytic anæmia. In the first case the anæmia was associated with portal cirrhosis of the liver and showed a partial response to parenteral liver extract therapy. He concluded that, since many cases do not respond to liver extract therapy, the macrocytosis could not be attributed solely to a lack of storage of the anti-anæmic factor in the diseased liver. A depressant effect on the bone-marrow of toxic products formed or retained as a result of liver failure was considered to be a possible cause of the macrocytic anæmia. It was suggested that in those cases in which there was partial response to parenteral liver therapy there might also be deficiency of the anti-anæmic factor, due either to a failure in production of "intrinsic factor" resulting from the gastro-enteritis which frequently precedes and accompanies liver cirrhosis, or to a failure in absorption of the anti-anæmic factor consequent on congestion in the portal circulation. In the second case there was chronic nephritis with nitrogen retention. It was suggested that severe macrocytic anæmia secondary to renal insufficiency may occur, although the common type of anæmia is normocytic. The value of sternal puncture in the differential diagnosis of rare types of anæmia was stressed. In the third case the outstanding features were a persistent reticulocytosis, severe macrocytic anæmia that did not respond to intensive treatment, and splenectomy and absence of increased hæmolysis. It was concluded that the anæmia was to be explained by aplasia of the bone-marrow, in which, however, there persisted small foci of erythropoiesis that became hyperplastic.

Dr. N. HAMILTON FAIRLEY stated that though in the deficiency anæmias the reticulocyte response to replacement therapy had been carefully studied, little had been done in the anæmias caused by bacteria and parasites. Tropical diseases afforded scope for such investigation. In malaria, after experimental infection, a hæmolytic normocytic anæmia rapidly developed. After Atebrin or quinine administration the temperature became normal and parasites disappeared from the peripheral blood; in 6–9 days a maximal reticulocytosis ensued, associated with blood regeneration. A fall from 5,500,000 to

4,000,000 erythrocytes per c.mm. might be followed by a maximal reticulocytosis of 8–9 per cent. In chronic malaria also the reticulocytosis was inversely related to the red cell count; here the red marrow was already hypertrophied and the reticulocytes somewhat increased before treatment had started. In blackwater fever an intense reticulocytosis followed intravascular hæmolysis. Anoxæmia consequent on blood destruction was the main factor involved. In amœbic liver abscess associated with mild degrees of anæmia, emetine injections were followed by disappearance of fever and a maximal reticulocytosis some 7–10 days later. Where there was secondary coccal infection such effects were not noted. Here a reticulocytosis persisted for many weeks, only disappearing with recovery. It appeared that malaria and amœbic parasites inhibited erythroblastic response in both these diseases, acting either directly on the normoblast and thus preventing adequate reticulocyte formation, or indirectly by decreasing the availability of factors essential to normal hæmopoiesis. Graphs showing the reticulocyte response in tropical sprue to oral liver extract and Campolon therapy were demonstrated, also the submaximal response and poor blood regeneration following Marmite and Ventriculin, neither of which proved satisfactory. The more refined and concentrated liver preparations—anahæmin (Dakin and West fraction) and reticulogen (Cohn fraction)—gave lower maximal responses and had to be given in relatively much larger dosage than in Addisonian anæmia to be effective.

Blood Tests in Disputed Paternity

Dr. JOHN C. THOMAS read a paper on the blood-grouping test in disputed paternity. After discussing the results of the test in nearly 10,000 cases abroad, he showed that if the test was routinely used in England approximately 1000 men yearly who are involved in affiliation suits would be proved not to be the guilty party. In view of impending legislation it was necessary to standardise the technique of the test to ensure accurate and comparable results. He emphasised the absolute necessity of complete control tests to ensure both specificity and potency of the sera, especially with anti-A and the immune anti-M and N sera, which if purchased through a commercial house were often contaminated and non-specific. The sera must be of known high titre and should be titrated at intervals. They should not be stored in capillary tubes. Weak sera often fail to detect the A2 agglutinogen especially in group A2B, and anti-N sera may be so weak as not to react with MN groups, and often fail to react with the N2 factor. The use of a too strong cell suspension is often a source of error and none stronger than 1 per cent. should be used. The test should never be done at a temperature lower than 20° C., and may be done in tubes or on slides, this being a matter of individual preference; titrations must always be done in tubes. In either method a negative reading must only be made after microscopical examination. If completely typical reactions are not obtained with the unknown and all the control cells the test must be repeated with fresh sera of which at least three of each type should be available. The cells should be tested always with two or three anti-M and anti-N sera. In all forensic blood groupings the serum agglutinins must always be examined as a check on the cell tests, and this should preferably be done by titration. When there is a reciprocal relationship between the cell and serum tests, and only then, is one justified in taking the results into a court of law.

A number of outfits for the transmission of pathological specimens through the post were displayed for inspection. These all complied with the Post Office regulations and had received official approval.

MEDICAL SOCIETY OF LONDON

AT a meeting of this society on Feb. 14th, with Mr. J. E. H. ROBERTS, the president, in the chair, a discussion on the results that can be expected of

Deep X Ray Therapy

was opened by Dr. J. H. DOUGLAS WEBSTER. He said that the results of X ray treatment depended upon many factors, including the site of the lesion, the stage of the disease, and the state of the patient. Ewing had said that the best chance for radiotherapy was an active growth in an active patient. Another important factor was the quantity and quality of the dosage, and the time intervals over which it was given. The effect of minimal doses was clearly seen in so-called "stimulation" therapy. It was orthodox to say that X rays had no stimulating effect, but he saw grounds for believing that they had an action somewhat similar to alcohol and other drugs which produced first a depressant and afterwards and indirectly a stimulating effect. A number of surgeons habitually sent patients for a small irradiation of the spleen before a gall-bladder operation in order to improve the coagulation time and increase the output of platelets. Small doses applied to the ovaries and pituitary gave good results in obstinate amenorrhœa and sterility. Stimulation of the bone-marrow with doses of about 1/20th of an erythema dose had been of value in agranulocytic angina—perhaps by a mechanism analogous to that which benefited patients with pernicious anæmia by inducing a greater production of red cells.

Deep therapy was also useful in the treatment of infective and inflammatory conditions. He had seen prompt response to small doses of X rays in cases of acute furunculosis of the face; and instances of the successful treatment of carbuncles could be found in the literature. Carbuncles associated with advanced diabetes did not, however, respond well. Many clinics in America had been treating rhinitis, nasal sinusitis, and acute mastoiditis by X rays, and rapid response had been reported in the great majority of a series of infants. X ray treatment was worth trying in inflammation of the tonsils, especially where operation was undesirable, as in a singer, and where the condition was severe and extended to a ring of adenoids, as in a child. Various types of endocarditis had been treated, especially in New York, by doses of about 1/10th of an erythema dose to the heart, and many patients had fared better than they would have under medical treatment. Another field in which X ray therapy held out promise was that of the glandular hyperplasias and functional over-activities, such as conditions of benign hypertrophy of the prostate, exophthalmic goitre, and over-activity and lesion of the anterior lobe of the pituitary. Prostatic enlargement was one of the conditions in which he had received most thanks from patients after treatment by X rays, and marked improvement in nocturnal frequency, residual urine, and other symptoms in more than half the patients treated was recorded in the literature. The pituitary gland was an especially suitable field for X ray therapy in that alternative treatments were so few. Good results were not infrequently seen in Cushing's basophil syndrome as well as in acromegaly. Several cases of Addison's disease had benefited greatly from

"teleroentgen" therapy—the irradiation of large surfaces of the body at a distance of one or two metres. One patient had lost her pigmentation and her blood pressure had returned to normal. Distant therapy had also been used in Malta fever and scleroderma.

X rays acted as a desensitiser in many allergic conditions—e.g., asthma, generalised psoriasis, pruritus, and eczema. They were almost the only possible treatment in rare blood conditions like lymphatic leukæmia and polycythæmia. Some authorities used distant therapy from the beginning, but Dr. Webster considered that better results were probably to be expected by treating the spleen and glands locally at first and holding distant therapy in reserve in case of a relapse. Hodgkin's disease could be treated by either method.

In the treatment of malignant disease the use of X ray therapy had been more often discussed and more clearly defined. Operation was the method of choice in operable cancer of the gastro-intestinal tract and gall-bladder and probably also of the kidney, though pre-operative irradiation might be desirable, especially in children. The same rule applied to carcinoma of the bladder. Surgery was also better for carcinoma of the body of the uterus and sarcoma of bone, but cancer of the skin, lip, cervix, mouth, pharynx, larynx, penis and testis, and Ewing's and one or two other sarcomata, especially of soft parts and glands, were better treated by X rays. In conclusion, he did not believe that anything would be gained by pushing up the voltage of the X ray generator. He quoted Stone of California in support of the view that the results of high-voltage X ray therapy had not excelled those of ordinary deep therapy at 200–250 kv. Advances were more likely to be obtained by a better arrangement of the time factor, such as the saturation method, the protracted fractional method, and Holfelder's decrescendo method.

He showed a table indicating that recurrences of many kinds of malignant growth took place regularly at an interval of eight or, less commonly, four lunar months. The onset of the recurrence could thus be predicted and treatment could be applied in its earliest stage, so that the percentage of recovery was increased four times.

Dr. W. M. LEVITT, confining himself to malignant disease, said that by the criterion of total disappearance of clinical disease over a period of years, certain varieties of cancer could undoubtedly be cured by X ray treatment. The concept of the radiosensitivity of a tumour was sufficiently precise to the radiotherapist accustomed to accurate and consistent dosage: it implied the vulnerability of the growth cells in relation to that of the normal tissues cells—the margin of safety over the lethal dose for the growth. Certain tumours were very radiosensitive, others were moderately so, and a third class were very resistant. Not all or even the majority of radiosensitive carcinomas were curable, and metastases accounted for the bulk of the failures. The site of origin was often more important than the type of the growth. Rapidly growing tumours were more likely to be sensitive, but slowly growing tumours were not necessarily resistant. Accessible growths were usually more amenable to treatment: skin cancers were easily treated but a growth in the middle of the œsophagus presented a serious undertaking.

Success could only be hoped for in a comparatively small proportion of all cases, and selection was therefore very important. Palliative treatment fell into two classes, one in which radiation was applied for the relief of an urgent pressure symptom—e.g., from a growth in the glands of the œsophagus or trachea; and the other for the prolongation of the patient's life and his return to work. If secondary deposits in bone were the only indication in X ray therapy, its success in their treatment would alone justify the work and expense applied to it to-day. Its disadvantages included the discomfort and suffering it caused, and these varied with the situation and type of the growth. They were usually negligible in the treatment of superficial growths, and at their worst in the treatment of growths in the mouth and throat, for it produced soreness of the skin and throat, dryness of the mouth, and loss of taste and appetite. Only palliation for some years could justify X ray treatment in these conditions. The reaction to treatment of the prostate and bladder was severe, but carcinoma of the prostate was worth treating in an otherwise favourable case. Blood changes were unimportant in the vast majority of cases, but might be considerable after the irradiation of very wide fields, which was therefore only justified in widespread disease. Malignant changes could not be produced by any modern application of X rays.

Dr. G. E. VILVANDRÉ said that good results had been obtained in lymphadenoma before the introduction of deep therapy. Hodgkin's disease was not cured by X rays, though life might be prolonged and dyspnœa relieved. Good results followed treatment of tuberculous glands of the neck if they were not caseous. X ray therapy would reduce an enlarged spleen but would not cure myelogenous leukæmia, though it would make the patient comfortable and reduce the white blood-cells to 50,000. Really effective results could be obtained in osteo-arthritis, joint function being restored and pain allayed. The radiologist could tell after a few doses whether the patient would benefit. The radiographic appearance of the joint was, however, not changed. The lesions of actinomycosis were healed, the sinuses would dry up, and the masses shrink. Some large mediastinal and retroperitoneal tumours disappeared after a course of irradiation, and he was convinced of the advisability of deep therapy for thoracic sarcoma if diagnosis had been early. His results had not been good in carcinoma of the bronchus, but real success often followed irradiation for carcinoma of the thyroid, and in some instances he would seriously consider giving deep therapy priority over surgery. On the other hand, X ray therapy of hard carcinomatous glands of the neck never gave satisfactory results.

Sir JAMES WALTON confessed that, as a surgeon, he had not given the radiologist a fair deal, for—at the beginning at least—he had only sent him the bad risks and relapsed cases. Even so, the results were quite good enough to show the real value of X rays in malignant disease, and he predicted that the younger members of the society would live to see the day when operation for carcinoma of the breast and thyroid would be considered absolutely unjustifiable.

The PRESIDENT bore witness to the good results obtained in the last few years by treatment of carcinoma of the bronchus with X rays. He suspected, however, that it might in some cases precipitate metastasis. An eminent pathologist had suggested to him that when large quantities of malignant cells were destroyed they became liquefied by autolysis; the liquid passed away through the lymphatic vessels and might carry with it a number of living cells. If this were true, it would provide an argument for the surgical removal of the primary growth wherever possible. X ray therapy was scientific enough on the mechanical side but essentially empirical on the clinical side.

Mr. WILLIAM IBBOTSON asked whether the association of active syphilis with a malignant growth prejudiced the result of the treatment.

Sir WILLIAM WILLCOX mentioned the value of X ray therapy in persistent sciatica and brachial neuritis, and asked how the radiation acted in these inflammatory conditions. He also spoke of good results in the removal of keloids.

Dr. WEBSTER, in reply, suggested that autolysed cells would pass into the lymphatic cells whether the patient was treated or not, so he would not be the worse off for treatment in this respect. If the normal defence of the body against malignant disease was situated in the reticulo-endothelial system, radiation presumably acted by stimulating that system. In one case he had thought that syphilis had hindered the effect of irradiation. Palliation of joint conditions might be due to reduction of inflammatory exudations and consequently of pressure upon nerves.

Dr. LEVITT, also in reply, said that the breast should always be removed, for the growth nearly always recurred. The rapid spread of a growth seemed to be bound up with its radiosensitivity, and he could not say whether X ray treatment favoured metastasis or not. He had never found that syphilis introduced either risk or obstacle. The body's reaction to irradiation was identical with its reaction to bacterial invasion: it poured out non-specific antibodies into the treated area and produced an active inflammation.

Dr. VILVANDRÉ also replied.

CARDIFF MEDICAL SOCIETY

A MEETING of this society was held in the Welsh National School of Medicine on Feb. 8th, with Dr. C. W. SHEPHERD, the president, in the chair. A discussion on the

Return to Work of the Injured Colliery Workman

was introduced by Mr. A. W. SHEEN, F.R.C.S. He said the defects in the present arrangements for treating the injured workman were due not to the doctor but to circumstances. He suggested a scheme for treatment in the best possible circumstances from the very first, which should be continued until the workman was restored to as full health as possible. The most valuable first-aid measures were the dressing to be carried by the workman and an ambulance squad formed by the men, so that as much as possible could be done on the spot. It was desirable to have a resting place for the seriously injured in the coal-pit itself, to obviate moving them too hastily. There should also be a casualty clearing station near by, suitably equipped and staffed, with a doctor present, where any further necessary treatment could be carried out and the disposal of the patient determined. The most important part of the scheme was an industrial accident hospital. Mr. Sheen visualised one of 200 beds, suitably equipped and staffed, and broadly constituted on the model of a war orthopædic hospital. The home doctors would be associate members of the staff. It would be a great advantage to group patients according to their disability. There would be amusements and sports, general physical training, vocational training for those not fit for their former work, and rehabilitation in what would be almost a miniature colliery, with coal-face, tools, &c. Restoration of function would be aimed at from the first. The atmosphere of the hospital would be made attractive in every way to the patients, while neurasthenic and allied conditions would be carefully treated. While not every injured workman would be admitted to hospital, he gave a warning of the possible serious consequences of apparently trivial injuries—those of the hand for example often needed in-patient treatment. The services of the hospital medical team should be available for all accidents: there were many other injuries besides fractured limbs. The scheme was analogous to the methods established by Sir Robert Jones during the late war, whose success had resulted in so few war cripples being found to-day. He considered that money would be saved by the adoption of these measures and suggested contributions from the employers, from the Miners' Welfare Fund, and from other sources.

Mr. IESTYN WILLIAMS, joint secretary of the Monmouthshire and South Wales Coal Owners' Association, said that both employers and employed were united in their desire that the best possible conditions should prevail within the industry. The cost of any scheme, however, could not be divorced from its effects upon the industry in other directions. Added costs would have grave effects on industry at a time when it could not pay the minimum wages provided in the industrial agreement. Even if it were able to exceed this minimum, 85 per cent. of any additional cost would be borne by the workmen.

Mr. ARTHUR HORNER, president of the South Wales Miners' Federation, referred to a paper he had noticed in THE LANCET of 1832, and said he did not think that the handling of certain industrial disabilities had advanced much since that date. He advocated the presence of doctors in the pits; he thought that small accidents were treated too lightly and objected to the "more than three days" classification of accidents. He did not think that the cost of the scheme was prohibitive; he suggested the Nuffield Trust and Special Areas Fund as possible benefactors. It was essential that the injured workman should be assured of his employment when he had recovered.

Dr. H. G. COOK, commending the scheme, said that thirty years ago in a paper read to the Insurance Institute of Cardiff he had recommended a special hospital and even indicated its possible location. Employers and the insurance companies to-day were apathetic and the latter were content to take the insurance premiums. He also condemned the apathy of workmen's organisations, saying they were more concerned with getting the largest "compensation" and the largest "lump sum" than with the betterment of the men's conditions.

Mr. NATHAN ROCYN-JONES said that it was important that more "light work" should be available and of there being physiotherapeutic centres in the coal valleys.—Mr. EVAN WILLIAMS, compensation secretary of the South Wales Miners' Federation, also urged that injured workmen when partially recovered should be given suitable light work. He thought that medical students ought to be specially taught industrial medicine.

Prof. DAVID JONES, professor of mining in University College, Cardiff, explained the difference between "reportable" and "non-reportable" accidents. He stressed the importance of having good fracture clinics. He admired the work done by medical men in the coal-field, particularly in relation to explosions.

The PRESIDENT said he recognised the difficulties in the present treatment arrangements and he alluded to the scheme of a union of 30 panels, a central hospital, and doctors practising different specialties.

REVIEWS AND NOTICES OF BOOKS

La chirurgie de la douleur

By R. LERICHE, Professor of Clinical Surgery in the Faculty of Medicine, Strasbourg. Paris: Masson et Cie. 1937. Pp. 428. Fr.65.

THIS volume contains a series of clinical lectures on the surgical treatment of pain, and gives in Leriche's vivid style an account of his wide experience in this field. He and his associates have earned for themselves a world-wide reputation for relieving pain in the viscera and in the limbs by excision of various portions of the sympathetic nervous system, and these clinical triumphs are now reviewed and explained in the light of the physiology of François Franck. His success is not in doubt; but his explanation of it will sound unconvincing to those who have been brought up to believe that pain impulses do not travel along sympathetic nerves. With the exception of trigeminal neuralgia, all the other forms of pain with which he deals—causalgia, painful amputation stumps, Raynaud's disease and arteritis, angina pectoris, and pelvic visceral pain—are considered to have their origin in and to be conducted by the sympathetic system, though no clear idea is given of the adequate stimuli or the receptor organs initiating the impulses which give rise to pain and reflexly produced various objective phenomena. The observation that many of these pains may be abolished temporarily by injecting a local anæsthetic around the sympathetic ganglia, and permanently by excising the ganglia, is something for which surgeons owe Leriche a great debt of gratitude, but it cannot be accepted as proof of his theories.

The title of the book does not indicate its limited scope, for the pains curable by sympathectomy, though obscure in their nature and fascinating to the investigator, are comparatively rare, and this book does not help in the treatment of intractable pain due to the involvement of spinal nerves by disease. But it gives much food for thought and may well provide the stimulus to further neurological research—even, it may be, with the laudable object of refuting some of the theories upon which Prof. Leriche has based his practice.

Neuro-Ophthalmology

By R. LINDSAY REA, B.Sc., M.D., M.Ch., F.R.C.S., Ophthalmic Surgeon to West End Hospital for Nervous Diseases; Surgeon to the Western Ophthalmic Hospital; Ophthalmic Surgeon to the British Hospital for Mental Disorders and Nervous Diseases. London: William Heinemann (Medical Books). 1938. Pp. 568. 42*s*.

THE attitudes of the ophthalmologist and neurologist to neuro-ophthalmology are very different. The ophthalmologist is mainly concerned to recognise those ocular manifestations which fall outside the scope of his treatment so that he may refer the patient to the appropriate specialist. If he is ophthalmic surgeon to a neurological hospital he develops a more specialised interest in the neurological aspect of ophthalmology. His angle of approach to the subject, however, must necessarily be different from that of the neurologist, who sees in the ocular symptoms of nervous disorders merely special examples of disorders of function and pathological processes which are constantly occupying his attention in other parts of the nervous system. The ophthalmologist who sets out to write a text-book on neuro-ophthalmology, however keen his interests and wide his experience, can hardly fail to be handicapped by the lack of that clinical background which the neurologist possesses. When he comes to relating ocular disturbances to general neurology he has to fall back upon descriptions written by other authors, and in these circumstances it is difficult to preserve balance and proportion. Ideally a text-book on neuro-ophthalmology should be written by an ophthalmologist and a neurologist jointly.

In spite of these handicaps Mr. Lindsay Rea has written a valuable and informative book. It is encyclopædic in its scope and there can be few conditions of common interest to the ophthalmologist and the neurologist which are not described, or at least alluded to. It suffers, however, from lack of planning and the pages of contents somewhat resemble an encyclopædia which has undergone a derangement of its alphabetical order. Thus, in chapter 10, which is headed "Abnormalities: Congenital and Degenerative. Subarachnoid Hæmorrhage," chorea and oxycephaly are strangely juxtaposed, while other odd bedfellows are Little's disease, otitic hydrocephalus, and fractures of the base of the skull. It is not at first sight easy to see why encephalitis lethargica should be included in chapter 9, "Localising Value of Ocular Symptoms in the Diagnosis of Diseases of the Brain," rather than in chapter 13, "Ocular Manifestations in Diseases of the Nervous System." Cerebro-spinal meningitis appears twice, first in chapter 9 and later, rather oddly, in chapter 16 which deals with "Poisons which Affect Vision."

The book has been excellently produced and is lavishly illustrated. Misprints are rather numerous, and in the next edition perhaps we may be spared "parkinsonianism." The book concludes with forty pages of references and an adequate index. It will undoubtedly find a place as a work of reference for those who wish to obtain the latest information, more particularly about the rarer diseases common to the eye and nervous system.

A Manual of Operating Room Procedures

By ALMIRA W. HOPPE, Science Instructor, Jewish Hospital of St. Louis; and LUCILLE M. HALVERSON, Supervisor of Operating Rooms, University of Minnesota Hospitals. Minneapolis: University of Minnesota Press; London: Humphrey Milford, Oxford University Press. 1937. Pp. 239. 9*s*.

THIS book has been prepared as a guide for the nursing staff in the operating theatre unit, and is to them what an abridged text-book of operation technique is to the surgeon. Every possible aspect of theatre work, the routine of the staff, the preparation and the sterilisation of instruments, gloves, and suture materials, the "set" required for all operations from the insertion of radon to laparotomy, is dealt with. In the last five chapters is given a brief synopsis of the main steps of every operation, allowing the nurse from her place at the instrument table to follow what is being done by the operating team. The information is clearly arranged in tabular form, so that the requirements for any particular purpose can be taken in at a glance. The pages lie flat, and the cover is made to survive a good deal of maltreatment and wetting.

It is perhaps inevitable that the requirements as set out should be those of a particular university, and that the names of needles and of many of the common instruments should be those more familiar to American

nurses than to British. Any attempt to give alternatives would have robbed the book of its great merit —clearness and decisiveness. One side of each page however is blank, and the corrections for any theatre unit can be written in the space. This manual should be of real service to any theatre sister who is anxious to improve the efficiency of her unit.

Frequency Curves and Correlation

Third edition. By W. PALIN ELDERTON, C.B.E., F.I.A., F.F.A. London: Cambridge University Press. 1938. Pp. 271. 12*s.* 6*d.*

THIS book, first published in 1906 and considerably revised in the second and present editions, deals in detail with Karl Pearson's system of curves for graduating and describing frequency distributions. It is an indispensable handbook for those who wish to fit such curves in practice or who are interested in the general question of curve fitting. The second half of the book discusses methods of measuring correlation and the problems of standard errors and goodness of fit in a way that is admirable for anyone with some mathematical training but will be less satisfying to the uninitiated. The examples, drawn mainly from the field of life assurance, show effectively that actuarial statistics can be analysed and explored in the same way as the statistics of other sciences.

A Textbook of Gymnastics

By K. A. KNUDSEN, late Chief Inspector of Physical Education to the Danish Board of Education. London: J. and A. Churchill. 1937. Pp. 364. 12*s.* 6*d.*

THIS book is opportune, for it sets out the place of gymnastics both as an all-round development and as a counteracting influence to the postural weakness and occupational defects of civilised life, as against gymnastics regarded as a purely recreational or æsthetic activity. Though not outstanding in the originality of the methods described, it is sane, balanced, and full of common sense. The chapters on the back should be read by every gymnastic teacher, for the recent tendency to mobilise the lumbar curve at the expense of its stability is very properly reprobated. A feature of the book is the reproduction of radiograms of various exercises with useful comments on faulty positions. The exercises are on the whole more strenuous than those in vogue here, but with the healthy country school-children of Denmark they appear not too strenuous for their purpose. The book may be recommended both to men and women gymnastic teachers.

Quarterly Journal of Medicine

THE January issue (Vol. 7, No. 25) contains the following papers:—

A TYPE OF GONOCOCCAL BACTERÆMIA WITH CHARACTERISTIC HÆMORRHAGIC VESICO-PUSTULAR AND BULLOUS SKIN LESIONS. By Harry Keil (New York). Five cases are described. They have fever and arthritis but no endocarditis. Gonococci are found, though not invariably, both in blood cultures and in the skin lesions. Recovery is the rule.

INSULIN RESISTANCE IN DIABETES MELLITUS AND THE EFFECT OF DIETARY CARBOHYDRATE. By O. L. V. de Wesselow and W. J. Griffiths (St. Thomas's Hospital). The degree of insulin resistance or sensitivity is judged from blood-sugar determinations following simultaneous administration of glucose by mouth and insulin intravenously. The findings do not permit any clear subdivision of the cases into insulin-resistant and insulin-sensitive types. Insulin resistance can be present or absent in the same patient at different times, and its presence seems to be associated with low carbohydrate intake. Both the activity of the anterior pituitary and the metabolic condition of the liver cell may be involved in its mechanism.

OVER-STIMULATION OF THE VAGUS NERVE IN RHEUMATIC FEVER. By J. D. Keith (Birmingham Children's Hospital). Lengthening of the P–R interval is demonstrated in children with acute rheumatism or chorea, both in those with systolic murmurs (indicating carditis) and those without. The P–R interval is shortened, but not to normal, by partial atropinisation, and also by adrenaline. It is suggested that the lengthening of the conduction time is the result of direct over-activity of the parasympathetic nerve-endings in the heart.

SOME RARE TYPES OF MACROCYTIC ANÆMIA. By L. S. P. Davidson and H. W. Fullerton (Aberdeen). Full case reports and discussion of (1) two cases of microcytic hypochromic anæmia which became transformed into macrocytic hyperchromic anæmia; (2) two cases of macrocytic anæmia due to liver disease; (3) five cases of hæmolytic anæmia with macrocytosis, one in association with a salmonella infection and another with a reticuloendotheliosis; and (4) three cases of aplastic anæmia with macrocytosis, one in association with hepatic cirrhosis, one with aleukæmic lymphoblastosis, and one unexplained.

THE RADIOLOGY OF PULMONARY INFARCTION. By K. Shirley Smith (Charing Cross Hospital and London Chest Hospital). An illustrated description and classification of the radiological appearances in thirteen cases.

THE MARCHIAFAVA-MICHELI SYNDROME OF NOCTURNAL HÆMOGLOBINURIA WITH HÆMOLYTIC ANÆMIA. By R. Bodley Scott, A. H. T. Robb-Smith, and E. F. Scowen (St. Bartholomew's Hospital). Its main features are moderate hepatomegaly, anæmia, hæmoglobinæmia, paroxysmal nocturnal hæmoglobinuria, and a liability to venous thrombosis; it runs a protracted course, little influenced by treatment, and ends in death. Two cases are described, with autopsy findings, which all appear to be secondary to intravascular hæmolysis of unknown cause.

HYPERINSULINISM DUE TO A PANCREATIC ISLET ADENOMA. By Russell Fraser, W. S. Maclay, and S. A. Mann (Maudsley Hospital). A detailed study of a case, in which the symptoms ceased after removal of the tumour. The psychiatric features of the hypoglycæmic attacks are described and discussed. A degree of hypoglycæmia (induced by insulin given intravenously), which before the operation would be accompanied by pronounced symptoms including even coma, was attended after the operation by practically no symptoms; it is suggested that the neurological and psychiatric symptoms of insulin excess may be due not simply to hypoglycæmia or tissue glycopenia, but to a direct toxic effect of insulin in the nervous system, operative only when the blood-sugar level lies below 70 mg. per 100 c.cm.

HÆMOLYTIC (SPHEROCYTIC) JAUNDICE IN THE ADULT. By M. C. G. Israëls and John F. Wilkinson (Manchester). Four cases of severe hæmolytic anæmia, with spherocytosis and increased red-cell fragility, are described; they differ from the usual acholuric jaundice in that the spleen is only slightly enlarged, is not packed with red cells, and contains cells resembling histiocytes; they recover after splenectomy, rather slowly.

THE ANTERIOR PITUITARY LOBE IN GRAVES'S DISEASE AND IN MYXŒDEMA. By C. L. Cope (University College Hospital). By its effects on the histological appearance of the guinea-pig's thyroid, the thyreotropic hormone of the pituitary is shown to be present in extracts from the anterior lobes of human pituitaries and in the serum of thyroidectomised rabbits, but to be absent (in detectable amounts) from normal human serum, from the serum of patients with myxœdema, and from the serum of patients with Graves's disease. Two methods of recovering thyreotropic hormone in concentrated form from urine are described; it is not regularly obtainable from the urine of normal human subjects or of those with Graves's disease. This evidence makes it unlikely that excess of thyreotropic hormone is a factor in the pathogenesis of Graves's disease, though defect of it may be concerned in some cases of myxœdema.

THE LANCET

LONDON: SATURDAY, FEBRUARY 19, 1938

THE CROYDON EPIDEMIC

THE outbreak of typhoid fever at Croydon last October and November has already led to the illness of 310 persons, of whom 43 have died. The cause is now established beyond doubt, and it is a cause that ought to have been prevented. Mr. HAROLD MURPHY, K.C., appointed by the Minister of Health to inquire into the outbreak, attributes it to the infection of a fifty-year-old chalk well at Addington. His medical and engineering assessors substantially concur. Three factors, he says, coincided: there was constructional work in the well; one of the workmen was a typhoid carrier; and chlorination was omitted. Dr. HOLDEN, the medical officer of health, never knew that work was going on in the well. He was never told that, while the work was proceeding, there would be no chlorination. Mr. BOAST, the borough engineer, responsible for the water-supply, was in ignorance too. Mr. BRANDRAM-JONES, the assistant water engineer, overestimated the value of the filtration plant and underestimated that of the chlorinator.

If the borough engineer failed to keep the medical officer of health informed of vitally important points, he himself was unaware that typhoid was being reported. The first case was notified on Oct. 27th, the second on Oct. 28th, and two more on Oct. 30th; the borough engineer learnt for the first time on Oct. 31st—and then by a telephone message from an unofficial source—that there was any typhoid in the borough. On Nov. 1st the medical officer of health told all the local doctors that typhoid had appeared in South Croydon. He gave no details however. Medical practitioners would have been greatly assisted in the task of diagnosis if they had known that water had been identified as the source of the disease. But no such identification had taken place. Dr. HOLDEN was disinclined to suspect water until he had eliminated other factors. The last substantial outbreak of typhoid fever had been traced to milk. The evidence given by Dr. SUCKLING at the inquiry seems to have convinced Mr. MURPHY that water should be immediately suspected and that, if there is any priority in the course of searching for possible causes, water should have the first place. "I think," said Dr. SUCKLING, "that water occupies the pre-eminent position with regard to the spread of typhoid fever . . . my view is that the majority of the epidemics of typhoid fever have been due to the infection of water rather than food." This delay—Mr. MURPHY calls it only a slight delay—in realising that water was or might be the cause of the epidemic is happily the sole criticism of Dr. HOLDEN which Mr. MURPHY regards as legitimate. The medical officer of health is described as a loyal, able, and industrious servant of the Croydon corporation, as well as a truthful and careful witness. His work in arranging for the treatment of the patients throughout the epidemic is highly praised.

The details of Mr. MURPHY'S report appear upon another page. The lessons are obvious. Men who work in wells must be physically fit. Mr. MURPHY does not insist that, as a preliminary, bacteriological tests should be made of fæces and urine, but he regards a Widal blood test as a not unreasonable precaution. The provision for the workmen at the Addington well to relieve themselves was highly dangerous. The use of an ordinary stable bucket for urine and the arrangements for it to be pulled to the surface speak for themselves. So careless was the supervision that workmen were allowed to dig and use a latrine almost directly above one of the well adits. Apart from the obvious sanitary precautions, there is the outstanding need of coördination between the medical officer of health and the borough engineer. Dr. HOLDEN and Mr. BOAST worked under the same roof. If the former had been told what was going on at the well, his advice would have been promptly given and the outbreak might have been averted. Dr. HOLDEN had apparently no facilities for knowing that the patients were all supplied with water from the same source. Sir WILLIAM WILLCOX, who gave evidence at the inquiry, stated that in all large areas there should be a committee which would represent the local doctors, so that in emergency there might be constant contact with the medical officer of health and so that information of symptoms and possible causes might be promptly exchanged. Not less important, it seems, is the clear determination of responsibility for water-supply. If a borough engineer has too many other concerns to be able to attend to what is perhaps the foremost object of public health, some other arrangement must be made for ensuring that the supply of pure water is under expert supervision. Lastly, the time may now have arrived for raising the question whether the medical officer of health is armed with all the powers which the nature of his duties may require.

THE STOMACH AND PERNICIOUS ANÆMIA

A RELATIONSHIP between pernicious anæmia and lesions of the stomach was recognised by FENWICK in 1880 when he described gastric atrophy in patients dying of the disease. Evidence of a functional deficit in gastric secretion was brought forward by W. B. CASTLE and his colleagues some fifty years later, in 1929. They showed that the stomachs of patients with pernicious anæmia were unable to secrete a substance they called "the intrinsic factor," which normally reacts with an "extrinsic factor" present in ingested food. In the normal person the two factors between them produce the precursor of the "pernicious-anæmia principle," which is stored in (and obtained from) liver, and MINOT and MURPHY had already proved

that lack of this principle leads to the development of the disease. Further elaborate experiments by E. MEULENGRACHT in 1935 demonstrated that, in the pig's stomach at least, intrinsic factor is secreted by the pyloric glands of the stomach and by Brunner's glands of the duodenum. This observation was in every way satisfactory, because it explained why pernicious anæmia does not always follow complete gastrectomy; for in such cases intrinsic factor could still be secreted by the first part of the duodenum.

At this time therefore we had a neat picture of the relation of the stomach to pernicious anæmia: the disease, it appeared, results from deficiency of the pernicious-anæmia principle in the liver, which is due in turn to failure on the part of the pyloric glands and Brunner's glands to secrete intrinsic factor. This failure was thought by many people to be due to a long-standing gastritis. Since 1935, however, certain rather disconcerting observations have been made, some of which are recorded elsewhere in our present issue. Dr. MAGNUS and Dr. UNGLEY describe there a careful histological study of the stomachs of seven patients with pernicious anæmia who died during a relapse. In all of them a characteristic lesion was found, localised to the mucosa of the body of the stomach and not affecting the pyloroduodenal region. That is to say, the only region that appeared normal was the one which, according to 1935 knowledge, should have been abnormal. Further, the lesion affected all coats of the stomach wall, including the muscle, and did not resemble in any way the result of an inflammatory process. A preceding gastritis could therefore not be regarded as a factor in its production. MEULENGRACHT himself has reported similar findings, and numerous gastroscopic examinations of patients with pernicious anæmia confirm the observation that the pyloric mucosa is not atrophic.

Nothing is definitely known about the cause of this peculiar gastric lesion. MAGNUS and UNGLEY suggest that it is possibly the end-result of some endocrine or nutritional deficiency, and information is certainly accumulating to suggest a relationship between the pituitary gland and hæmopoiesis, possibly through the gastric mucosa. The work of DODDS and his associates[1] at the Middlesex Hospital incriminates the posterior lobe, since they found that massive doses of posterior pituitary extract given to rabbits produced ulceration of the gastric mucosa, and hyperchromic anæmia. On the other hand SNAPPER and GROEN, in collaboration with HUNTER and WITTS,[2] after studying cases with achlorhydria, anæmia, and subacute combined degeneration associated with pituitary and gonadal insufficiency, suspect disorder of the anterior lobe. It is clear that though we can now treat pernicious anæmia with success and know something of the way in which it develops, the more fundamental ætiology of the disease has still to be ascertained.

[1] See *Lancet*, 1937, **2**, 698.

[2] Snapper, I., Groen, J., Hunter, D., and Witts, L. J., *Quart. J. Med.* 1937, **6**, 195.

FOOD AND THE GROWING FAMILY

IN recent reports on nutrition[1] particular emphasis is laid upon the requirements of children. An adequate and well-balanced diet is held to be more important at this stage of life than at any other, for it is needed to ensure a proper rate of growth, a maximum resistance to disease and ill health, and thus the development, so far as nutrition is concerned, of a healthy adult generation. In the absence of a system of family allowances, however, it must be difficult, and often impossible, for the poorer sections of the population to provide the diet that the nutritionists regard as desirable. In other words, the family diet will probably be unsatisfactory just at the period when it is most important for it to be satisfactory. How far lack of money does in fact have this result is discussed by Dr. FRASER BROCKINGTON in a valuable paper[2] based on his observations in West Sussex.

BROCKINGTON has examined the weekly budgets of 80 rural and 97 urban families and has analysed them in terms of total income and of expenditure on food per "man-value." As a standard against which to assess these families he takes a diet from the report of the British Medical Association's committee on nutrition. The cost of this at 1936–37 prices would be 7*s*. 8¾*d*. per "man," and it is noteworthy that this is very close to the amount that the housewives in his sample actually seem to aim at spending when income allows. Since, however, the B.M.A. diet has been criticised as over-generous BROCKINGTON takes a second standard with only 2400 calories and 37 grammes of first-class protein at a cost of 5*s*. 10¾*d*. Upon the first standard about 51 per cent. of the children in the urban families fall below sufficiency of total food and 45 per cent. of first-class protein; upon the second standard the figures are about 20 and 21 per cent. With the rural group the figures are still worse, for 72 per cent. of children fall below the first standard and 40 per cent. below the second. Accepting 2*s*. per man-value per week as a conservative estimate of the minimum expenditure on first-class proteins, some 13 per cent. of the urban children and 33 per cent. of the rural were subsisting on amounts suggesting serious deficiency.

The urban group of families can be further divided into three groups: "entrant" with a child not more than seven years old at school; "leaving" with one or more children earning over 10*s*. weekly; and "middle" with several children of school age. The percentages assessed as deficient in these three groups are 5, 45, and 51 on the higher standard, 0, 7, and 26 on the lower standard. If the "middle" group is subdivided by number of children the deficiency increases steeply with the growth of the family, and where there are more than two children nearly

[1] For example, the first report of the Ministry of Health's advisory committee on nutrition and the publications of the Health Organisation of the League of Nations.

[2] *J. Hyg., Camb.* January, 1938, p. 40.

half the families fall into the zone of "marked protein deficiency." The rural group gives very similar results. There is the same steady decline in food provision as the family grows, and where the wage is below 40*s.* it seems to become insufficient after the birth of the first child. Most significant again is the decline in the provision of first-class protein foods as the family grows. With medium wage-earners the allowance for food of 9*s.*–11*s.* per unit per week when the family is small is reduced to about 3*s.* when the family reaches a large size and before the first children begin to earn. This situation—precisely the reverse of what is desirable—has of course been recognised and has led to the milk-in-schools scheme and the provision of meals free or at reduced cost for the children of necessitous families. BROCKINGTON'S study suggests that it needs wider recognition and more provision to remedy it. Such financial deficiencies have an obvious bearing on the reduced size of family which the population experts deplore.

EXOPHTHALMOS AND THE PITUITARY

EXOPHTHALMOS has always been the most puzzling symptom of Graves's disease, and many explanations of it have been proposed. It has been attributed to contraction of the smooth muscle of the orbit in response to over-activity of the sympathetic, to dilatation of the orbital blood-vessels, to increase in the volume of the retro-ocular fat, to œdema of the orbital contents, and to relaxation of the extra-ocular muscles. During recent years two separate but converging lines of approach have brought us much nearer to a solution of the problem. The association of external ophthalmoplegia with conspicuous exophthalmos in patients presenting general symptoms of hyperthyroidism has been known for many years, and a good deal of attention lately has been devoted to this syndrome. In the United States several workers have reported cases of progressive exophthalmos, accompanied by ophthalmoplegia, arising after thyroidectomy performed for hyperthyroidism. The histology of the orbital contents in this condition has been studied and there is general agreement that the external ocular muscles are greatly enlarged owing to œdema and show foci of lymphocytic infiltration. The orbital fat is œdematous and there may be papillœdema. RUSSELL BRAIN [1] has pointed out that since this syndrome may occur either spontaneously in association with hyperthyroidism, or post-operatively in the presence of myxœdema, the exophthalmos and ophthalmoplegia can hardly be attributed to thyroxine, which moreover very rarely produces exophthalmos when administered even in large doses either to man or to animals.

For several years it has been known that the anterior lobe of the pituitary secretes a hormone, the thyrotropic hormone, which when injected into animals temporarily evokes all the symptoms of Graves's disease, including exophthalmos. It has also been shown that this hormone will cause exophthalmos even more readily in thyroidectomised than in intact animals. Post-thyroidectomy exophthalmos in man is thus paralleled by post-thyroidectomy exophthalmos produced by the administration of the thyrotropic hormone of the pituitary in animals. Is the unknown factor responsible for the exophthalmos in man the thyrotropic hormone of the pituitary? This question cannot be answered at present, but a piece of evidence which points suggestively in this direction has just been published by SMELSER.[2] Hitherto there has been no histological study of the orbital contents in exophthalmos experimentally induced in animals by means of the thyrotropic hormone. SMELSER has administered this hormone to 50 guinea-pigs, which were previously subjected to thyroidectomy and unilateral cervical sympathectomy. Exophthalmos developed in all but 3 animals and persisted after death. The weight of the orbital contents was greater in the experimental animals than in controls, the retrobulbar tissue of the exophthalmic animals being 34 per cent. greater than that of the controls. This increase of weight was due to œdema of the orbital fat and extra-ocular muscles, which both showed histological changes similar to those found in biopsies of the orbital tissues in 6 human cases of the type already described. In the animals cervical sympathectomy did not prevent the development of the exophthalmos. Though this appeared to be somewhat slighter during life on the sympathectomised side, the difference between the two sides disappeared after death.

The importance of SMELSER'S paper lies in the fact that for the first time he has reproduced experimentally the histological changes found in man in the condition known in America as "malignant exophthalmos." He ends his paper with the observation that further analysis is necessary to establish the identity of the mechanism involved. We are still completely in the dark as to how the thyrotropic hormone of the pituitary brings about a gross œdema of the orbital contents. We are also ignorant of whether the mechanism responsible for the exophthalmos of Graves's disease is the same as that which is operative in the syndrome that BRAIN has termed "exophthalmic ophthalmoplegia." The influence of the thyroid and the pituitary upon one another is still largely unexplored. Much remains to be discovered, but enough has already been learned to encourage the hope that we may soon be able to speak far more confidently about the causation of exophthalmos and the nature of Graves's disease.

Prof. SIMON FLEXNER is giving a lecture in the physiological department at Cambridge on Monday next at 5 P.M. His subject will be epidemic poliomyelitis and epidemic encephalitis.

ON Feb. 24th and March 1st, at 5 P.M., Dr. B. E. SCHLESINGER will deliver the Milroy lectures to the Royal College of Physicians of London. He will speak on the public health aspect of heart disease in childhood.

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[1] Brain, W. R., *Trans. ophthal. Soc. U.K.* 1937, **57**, 107.

[2] Smelser, G. K., *Amer. J. Ophthal.* 1937, ser. 111, **20**, 1189.

ANNOTATIONS

A BLUE SARCOPHAGUS

MANY Government documents bear signs of that skill in marshalling a mass of data and giving them coherence for which the upper ranks of the civil service are justly renowned. The supplementary report[1] of the Board of Control (Lunacy and Mental Deficiency), as we have already felt it our duty to indicate,[2] is not one of them. As in former years the first part embodies, in erratically alphabetical order, the reports of mental hospital superintendents as to the pathological work and research done during the year, and the second part (or appendix) reproduces the reports made by the Commissioners on their annual visit to each institution. A summary which prefaces the supplement is the only guide the reader has to the things that may interest him in this jungle. If the supplement contained only statistics of routine laboratory examinations, and a list of studies the results of which had been published during the year, such a lay-out would be unobjectionable, but at present a good deal of otherwise unpublished material is put forward here. It would perhaps be better, if the four existing specialist journals in this country will not accept papers reporting such work, that another less exacting journal should be created for the purpose; the writers would then at least know that their findings were likely to be read, and they would get the benefit of criticism. Certainly some of the brides of quietness buried in this official urn deserve to be brought to life and honourably ravished by the Quarterly Cumulative Index Medicus; there are, for instance, rare cases and interesting post-mortem findings, complete with discussion and references. How great is the need for classification in this omnium-gatherum may be judged from the twelve consecutive pages (177–188) which contain the following:—

An outline of the present position of tissue culture in the study of the nervous system

Abstracts of three investigations published elsewhere: into the incidence of neurosis, the detection of diphtheria carriers, and the treatment of enteric carriers by cholecystectomy

Detailed reports of cases of adrenal insufficiency, apoplexy (in a paraphrenic), and cardiogenic delirium

A long account of the work done in a dental department and another describing the therapeutic effect of a hair-dressing room in the hospital

Two lists of routine laboratory examinations

Records of cases having no direct psychiatric bearing (treatment of pyelitis with mandelic acid, cod-liver oil for burns, and scarlet fever caused by the hæmolytic streptococcus)

Observations on dysentery

Some details about new apparatus installed.

It is evident in the report that the Board of Control would like to see some sort of investigation going on in every mental hospital. But research, especially in a subject as difficult as psychiatry, can be so much wasted effort unless it is done by trained people or under expert direction. These pages show how wide is the qualitative range of psychiatric research in this country, from valuable work of international repute to futile groping and repetition. It is to be hoped that the new Psychiatric Research Bureau will direct and coördinate much of the energy that is now spilt. It should also ensure a better proportion between painstaking clinical research and laboratory studies; although the latter may appear more "scientific," they make little use of the psychiatrist's special knowledge, and expose him, unless he has exceptional resources, to the risk of unreliable findings. In some centres, as the reports show, experts in chemistry, pathology, psychology, and other disciplines have been brought in to coöperate with the clinical workers, with happy results. There is indeed so much impressive original work being done in our psychiatric hospitals that it is a pity when an undiscriminating olla-podrida lumps it together with mediocre, or less than mediocre, fruits of industry.

[1] The twenty-third annual report of the Board of Control for the year 1936. Part II. H.M. Stationery Office. 1938. Pp. 540. 8s.

[2] *Lancet*, 1937, **1**, 212.

A DELINQUENCY CLINIC

IN his sympathetic remarks at the official opening last week of the new offices of the Institute for the Scientific Treatment of Delinquency Lord Roche suggested as a chief reason for public support the satisfaction to be gained from helping the weak and erring. Who knows, he asked, when we or ours may be in need of the like help? Actually it is true that those who have benefited most at the Institute's clinic have suffered from psychoneuroses similar to those which come under treatment every day at the Tavistock Clinic, the London Clinic of Psycho-analysis, and other psychiatric out-patient departments. But whereas at these clinics the danger of an encounter with the civil arm is only one of many possible complications and does not entitle to priority of treatment, at the Institute's clinic this danger constitutes the emergency for which the clinic was founded and forms an essential criterion in the selection of cases. Nothing but the urgent need of such a clinic could have brought together a gathering so large and distinguished as to strain its capacity. The magistrate's difficulty, said Lord Roche, was not so much in the determination of guilt or innocence as in the decision what sentence to impose, and, without taking sides on the ethics of punishment, he was quite clear in his own mind that at one end of the scale is the person who offends against the law from a weakness or infirmity which may be remedied or cured, and at the other end of the scale the person who has said "Evil, be thou my good" and is determined to live by preying upon society. Paraphrasing these words from the medical standpoint, it is agreed that the psychoneurotic cases, irrespective of the type of offence, have proved the most suitable and profitable to treat and have given the best results, normal cases being much more difficult, even if not hopeless.

Before this formal opening the clinic had already been working quietly for six months at the house in Portman-street, after accepting for four years the hospitality of the West End Hospital for Nervous Diseases. In the meantime the number of patients has steadily increased from year to year up to a total of 167 during the last twelvemonth. Most of them are referred from the courts by magistrates and probation officers, but an increasing number come at the request of their doctors or even on their own initiative. Apart from the lecture room where special courses are held for probation officers and others interested in delinquents, the clinic includes a room for complete physical examination and a series of consulting-rooms where patients are dealt with in

the same atmosphere of confidence as in a private consulting-room. Dr. E. T. Jensen and the other founders of the Institute may well feel satisfied with the outcome of a venture which started in 1932 as a result of an investigation, on behalf of the Medical Research Council, of a number of prisoners in Holloway. Lord Roche, as the result of his own experience, described the help now being given as essential to administrators of the law; and while the clinic may be regarded as an efficient out-patient department the need becomes daily more apparent of an observation centre and an in-patient department for those on whom delinquency has already taken a firmer hold. No rich man could find a more remunerative use for a sum of £30,000 than putting it into the hands of the Institute for this purpose.

A FRATERNAL MISSION

In the supplement to the *British Medical Journal* of Feb. 12th, Sir Henry Brackenbury gives an account of the mission he undertook last year on behalf of the British Medical Association. The chief object of the mission was to advise the New Zealand branch of the Association on the position created by the announced intention of the New Zealand Government to introduce a scheme of national health insurance into the Dominion Parliament next session, but, at the request of the Association, Sir Henry's tour included a visit to the United States and a return journey via Australia, Malaya, Ceylon, Bombay, Aden, and Malta. In the centres of the Empire visited he was able to get into personal touch with the far-flung work of the Association in many lands, and his visit to the United States was particularly well timed in view of the problems of medical practice that are now engaging the attention of the profession in that country.

The present position in New Zealand is regarded with considerable anxiety by the medical profession. The Government, which came into power with an enormous majority after the general election in the autumn of 1935, have secured the enactment of measures that have made drastic changes in the social and economic life of the country, including the institution of a 40-hour week; and though their health insurance scheme has not yet been published, or even it seems definitely formulated, it is known that influential members of the Government party are pressing for the establishment of a medical service for the whole population. Such a scheme, involving the virtual abolition of private practice, would be unacceptable to the medical profession who, though not opposed to health insurance, think it should apply only to those unable from their own resources to pay for the medical care they may require; and it is contended that such persons are relatively fewer in New Zealand than in most other countries. The position is made more difficult by the chaotic nature of New Zealand's local government, which is administered by a large number of uncoördinated ad-hoc bodies, directly elected and usually on party lines. The public hospitals are administered by hospital boards, which are numerous and in many areas fail to command public confidence, and the profession are opposed to any scheme that should attempt to place health insurance in the hands of these bodies. Further difficulties are created by the sparse population of many areas in New Zealand, which though rather larger than Great Britain, has only 1,500,000 inhabitants. A health insurance scheme in such a country must obviously be capable of adjustment to meet widely varying local conditions. In view of these difficulties, it was fortunate for New Zealand that both the Government and the profession should have had opportunities for conferring with Sir Henry Brackenbury, who from his long experience as a general practitioner, a leader in the counsels of the British Medical Association, and a distinguished local administrator has unique qualifications for advising in the present emergency.

Sir Henry has some interesting things to say about Australia, where the Commonwealth Government are now preparing a health insurance scheme with the assistance of Sir Walter Kinnear and Mr. T. Lindsay of the Ministry of Health. In the United States, where he addressed meetings of practitioners in five cities, he found that health insurance was regarded with interest and also with antagonism by many doctors, largely from the fear that it would bring the medical profession under the control of party politicians. He also found widespread misunderstandings of the British health insurance system and its effects on the profession. One of the conclusions that emerge from Sir Henry's valuable report is that the conditions under which medical practice is carried on vary widely in different countries, that each country has its own special problems, that no scheme of health insurance has any chance of success unless it provides a solution of those problems, and that a solution is not likely to be forthcoming without the goodwill and close coöperation of the medical profession.

CAVES IN PALESTINE

The discoveries of Miss Dorothy Garrod's expedition in caves at Mount Carmel, the subject of Sir Arthur Keith's lecture last Monday to the Royal College of Surgeons, have thrown fresh light upon the inhabitants of Palestine in the early Stone Age. The caves contained the deposit of centuries of habitation, and yielded a rich assortment of stone tools, fossils of animals, and bones of men and women, extending over a period of 100,000 years before Abraham buried his wife in the cave of Machpelah in the land of Canaan. One cave was a veritable graveyard with the skeletons of ten people, which careful burial and the action of the local limestone had combined to keep in a remarkable state of preservation. For the last few years Sir Arthur Keith and Mr. McCown have been restoring these finds at the Buckston Browne research farm at Downe in Kent. Although these people date from before the Neanderthalians of Europe they have many more features in common with modern man and seem to have come from a stock akin to that which gave the world its Caucasian or white inhabitants. They were tall, the men being between 5 ft. 8 and 5 ft. 11 and the women between 5 ft. and 5 ft. 4. Their eyebrow ridges resembled a gorilla's and they had massive jaws, large mouths, thick strong necks, and a greater variety of noses than would be found in one place at the present day, suggesting a people in the throes of evolutionary change. Though simian in appearance their brains were as large as a modern man's, though of simpler convolutionary pattern, and their elaborate burials —a hall-mark of humanity—point to a high degree of intelligence. They seem to have believed in an after life, as one man had had a boar buried with him, presumably so that he should not be deprived of his favourite roast in the next world. There was evidence too that in warfare they had advanced beyond the stage of the stone club. One male skeleton had a wound which penetrated the hip-joint and entered the pelvis, and a cast made of this

showed that it had been made by a four-sided spear. The violence needed to produce this wound was strong evidence of malicious intent, and this probably represents the earliest war wound on record.

RADIOGRAPHY OF THE URETHRA

SINCE 1910 urethrography has been a recognised method of diagnosis, and much has been written about it. Oltramare and Martinet [1] of Geneva employ the usual technique, using a 40 per cent. solution of Lipiodol. Their only addition is a method of fixing the catheter through which the injections are made; they do this by surrounding the penis with a pneumatic bandage (like those used in estimating blood pressure) to which are attached small chains that hold the soft catheter in position. Two plates are exposed—one anteroposterior and the other oblique—so as to avoid the shadow of the ischial tuberosities and heads of the femurs. The illustrations of this paper testify to the progress that has been made in the technique of outlining the urethra, for lesions so minute as distended diverticula are clearly demonstrated. A series of illustrations also show various types of normal urethra. Urologists who have hitherto considered urethrography of little practical value will be convinced, after reading this article, of its greater potentialities. The photographs obtainable help to explain the physiology as well as the pathology of the urethra. Moreover, the report in our issue of Feb. 5th of two cases of air embolism following the ordinary urethroscopy make one additionally disposed to consider this alternative.

VENOUS THROMBOSIS AS A SIGN OF VISCERAL CANCER

SPONTANEOUS venous thrombosis in both the upper and lower limbs serves as a valuable sign in the diagnosis and prognosis of visceral cancer. But as a clinical fact it has been wellnigh forgotten of recent years, and it is generally ignored in modern practice according to A. P. Thomson,[2] who reports three cases. In the first, the attack of thrombosis occurred in the veins of the limbs of a woman in the early forties, who died of malignant disease in the liver 14 months after the original thrombosis. In the second patient two attacks of thrombosis in the veins preceded and several attacks accompanied gastric symptoms considered on radiographic evidence to be due to a malignant growth of the cardiac end of the stomach, which gave rise to obvious metastases in the liver before death a few months later. Vague abdominal symptoms in the third patient led to a complete investigation of his alimentary tract with negative results, but thereafter he had several attacks of thromboses and ultimately a laparotomy revealed a carcinoma of the head of the pancreas, with multiple secondaries in the liver.

The thrombosis often precedes evidence of the neoplasm. In none of Thomson's cases was the evidence conclusive that the stomach was primarily affected, and this bears out Prof. John Ryle's statement that the association is rare, at least as compared with the presence of peripheral neuritis.[3] Therefore, although Thomson is right in calling our attention to the relationship, which Trousseau summed up when he said—

"When you are undecided about the nature of a disease of the stomach, when you hesitate between a chronic gastritis, a simple ulcer and a carcinoma, a phlegmasia alba dolens occurring in the leg or in the arm will put an end to your indecision, and you will be able to assert positively that a cancer is present"

we must remember that that cancer may be in other abdominal organs besides the stomach itself.

[1] Oltramare, J. H., and Martinet, R., *Schweiz. med. Wschr.* Jan. 1st, 1938, p. 12.
[2] *Bigham med. Rev.* 1937, **12**, 259.
[3] *Clin. J.* 1937, **66**, 133.

THE EXCRETION OF SEX HORMONES IN URINE

IN his paper read at the Royal Society of Medicine last week Dr. R. K. Callow took a critical view of the significance of the excretion of sex hormone activity in the urine. He spoke particularly of the extent to which sex hormones are subject to destruction and transformation in passing through the body. If, with the present experimental methods, never more than 20 per cent. of hormonal activity has been recoverable in the urine after administration—and this proportion is attained only with high doses—then it does not seem unduly cautious to reserve judgment on the diagnostic value of assays of urinary hormone in cases where there is no gross disturbance of hormonal activity. The position may of course be improved when knowledge of the chemistry of hormone metabolism increases. Thus Venning and Browne [1] have demonstrated the transformation of progesterone, the hormone of the corpus luteum, into pregnanediol by the body; and the recovery of this inactive compound in a chemically recognisable and weighable form (sodium pregnanediol glycuronidate) in the urine in the proportion of 12–46 per cent. of the equivalent of hormone injected is a better argument for this particular type of urinary hormone assay than has been advanced for any others. The investigation of male hormone activity excreted in the urine has been the special concern of the group working in London at the National Institute for Medical Research, and their results, which are in many respects complementary to and confirmatory of the results of the groups working in Amsterdam [2] and in Chicago,[3] emphasise the lack of simple relation there may be, not merely between administered and excreted hormone activity, but also between physiological state and hormone in the urine. Any superficial theory which connects androgen excretion with male sexual function breaks down completely when it is shown that men cannot be distinguished from women, or normal men from eunuchs, in respect of urinary androgen. The origin of these androgenic substances of the urine was discussed in our own columns not long ago by Dr. A. S. Parkes,[4] and further evidence is accumulating that one major source is the adrenal cortex. Dr. Levy Simpson, in his contribution to the discussion reported on p. 435, described how the idea of finding an increased excretion of male hormone in virile women arose in 1933. Later, Simpson, de Fremery, and Macbeth were able to demonstrate such an excess of male hormone activity in some cases of adrenogenital syndrome.[5] In patients with adrenal tumours the urinary excretion reaches very high levels indeed, and in a case from the London Hospital mentioned by Dr. Callow it amounted at one time to 3500 international units per litre. Moreover, both in this case

[1] Venning, E. H., and Browne, J. S. L., *Endocrinology*, 1937, **21**, 711; see *Lancet*, Jan. 1st, 1938, p. 39.
[2] Dingemanse, E., Borchardt, H., and Laqueur, E., *Biochem J.* 1937, **31**, 500; *Schweiz. med. Wschr.* 1937, **187**, 670.
[3] Gallagher, T. F., Peterson, D. H., Dorfman, R. I., Kenyon, A. T., and Koch, F. C., *J. clin. Invest.* 1937, **16**, 685; Kenyon, A. T., Gallagher, T. F., Peterson, D. H., Dorfman, R. I., and Koch, F. C., *Ibid*, 1937, **16**, 705.
[4] *Lancet*, 1937, **2**, 902.
[5] Simpson, S. L., de Fremery, P., and Macbeth, A., *Endocrinology*, 1936, **20**, 363.

and in another with a lower level of excretion, a readily characterisable compound could be isolated from the urine—namely, dehydro-androsterone, previously known as a constituent of normal urine present in very small amount. Now that methods of extraction, of biological assay, and even of rapid chemical examination are becoming established, hormone analysis of the urine can be of great diagnostic assistance in disorders of this kind—and of course in pregnancy. But in regard to minor endocrine disturbances a cautious and conservative attitude must be maintained until the results of hormone analysis in normal subjects are more consistent and until their assumed significance rests on a sounder scientific basis.

AN INTERNATIONAL PHARMACOPŒIA

CHANGES within the League of Nations during the past eight years are reflected in the names of the countries represented in the technical commission of pharmacopœial experts whose appointment by the Health Committee of the League we reported last week. When the international agreement on the formulas of potent drugs was signed at Brussels in 1929, Italy, Germany, and Japan participated. They are now absent and Soviet Russia, which has since become a member, has been invited to a seat on the commission. Half the eight members[1] are men who have been associated during these years with the technique of international conferences, and all four of them are members of the pharmacopœia commissions of the nations they represent, two being chairmen of their national commissions. The representative of Russia has not yet been nominated, but the Government of the U.S.S.R. is said to be anxious to assist the plan.

The arguments in favour of an international pharmacopœia are well known: it would expedite the spread of medical knowledge, would enable pharmacists to dispense prescriptions brought them by travellers from other countries, and would be a convenience to manufacturers of active principles and galenical preparations who now have to work according to a variety of standards. The delay in formulating a book of standards is largely due to the causes that frustrated the building of the tower of Babel; for the Latin, and even the French, of many men learned in the science of drugs does not suffice for untrammelled intercourse. For these and for geographical reasons, and for others rooted in idiosyncrasies, the completion of the first edition of the much-needed volume cannot be speedily accomplished. Nevertheless the decision of the Health Committee of the League is an important step towards an object long desired by medical men of many nationalities. In some directions international collaboration has been making progress despite the difficulties of the past few years. Thus the permanent Commission on Biological Standardisation, whose decisions are accepted by the British and other pharmacopœia commissions, is a happy example of the success of common sense. The Health Committee has perhaps been wise to limit the commission to eight members, for it is a common experience that small committees work more rapidly than large ones. The fact that the communiqué which notifies the nominations specifies the places with which the nominees are associated, rather than the nations to which they belong, suggests a wish to cause no disappointment to countries which, unfortunately, are not actually represented.

When the new commission settles down to work it would not be surprising if one of the first matters to which it devoted attention were Article 8 of the 1929 agreement, which enumerates 77 drugs and preparations that should conform to specific descriptions. Most of these are powerful poisons that are administered in small doses, but the list might advantageously be extended to include such products as quinine, chloroform, ethyl chloride, adrenaline, the salicylates, hexamine, the salts of mercury, camphor, and indeed many other drugs that are definitely active therapeutically. It is true that such an extension would be an addition to the labours of the commission, but in the long run the inclusion of as many items as possible in an international pharmacopœia would greatly increase its usefulness.

[1] The members so far appointed are Dr. C. H. Hampshire (London; chairman), Prof. H. Baggesgaard (Copenhagen), Prof. V. E. Zunz (Brussels), Prof. M. Tiffeneau (Paris), Prof. R. Eder (Zurich), Prof. L. van Itallie (Leyden), and Prof. E. Fullerton Cook (Philadelphia).

THE TREATMENT OF AURAL VERTIGO

AURAL vertigo may arise from such diverse causes as impacted wax and tumour of the acoustic nerve. When the symptom accompanies suppurative disease of the ear, it indicates an acute labyrinthitis. Often, however, it is associated with non-suppurative disease of the middle ear and may be cured or relieved by appropriate treatment, and especially by restoring the patency of the Eustachian tube. Although there is probably always some diminution of hearing in the affected ear, at any rate during the attack, functional tests often show a deafness of the nerve—rather than of the conduction—type, for which no obvious cause can be found. Opinion differs widely about the underlying cause and the most appropriate treatment. Wright[1] believes that all such cases are secondary to a focus of infection; he calls the condition "focal labyrinthitis" and invokes the analogy of chronic iritis; he quotes 22 cases treated by eradication of septic foci, all of which were cured of their vertigo. Mygind[2] of Copenhagen considers the underlying condition to be a disturbance of the general water metabolism which produces an intracellular œdema of the labyrinth, and has obtained good results by drastically curtailing the intake of fluids; he quotes Fürstenberg in the United States who concludes that the essential factor is retention of sodium and treats these cases by reduction of salt in the diet, at the same time giving ammonium chloride in large doses of 3 grammes three times a day.

The attacks of vertigo vary greatly in frequency, severity, and duration in different patients and in the same patient at different times. They can be so distressing and disabling that even major operations for their relief are entirely justified. Of these operations intracranial division of the VIIIth nerve is well established; it has now been refined by limiting the section to the vestibular nerve. With due skill and experience the facial nerve can be avoided, and the mortality is very small. Hautant[3] has reported good results, amounting to cure in about half his cases, by simple opening of the external semicircular canal, while Mollison[4] suggested the injection of absolute alcohol into the opened canal and obtained cure in 22 of 28 cases. These procedures involve a mastoid operation, to obviate which Wright injected alcohol through the oval window, with the result that the vertigo was cured but otitis media and facial paralysis developed. It is with the object of avoiding

[1] Wright, A. J., *J. Laryng.* January, 1938, p. 97.
[2] Mygind, S. H., *Proc. R. Soc. Med.* 1937, **30**, 1485.
[3] Hautant, A., *Bull. Acad. Méd. Paris*, 1934, **111**, 933.
[4] Mollison, W. M., *J. Laryng.* 1936, **51**, 38.

these complications that Mr. Roydon Peacock has carried out the investigation reported on p. 421. As the labyrinth is a closed cavity with rigid walls, it is obvious that any injection into it must be accompanied by the return of a similar quantity of fluid into the tympanum, and that permeation of the irregular cavity must be uncertain and incomplete, while the escape of fluid containing a large proportion of alcohol into the tympanum is likely to cause severe inflammation. For this reason Mr. Peacock has ingeniously employed a needle with a double lumen by which suction is applied at the same time as injection, so that a circulation of alcohol through the labyrinth is obtained.

There remains the important risk of facial paralysis after these injections. Mr. Peacock found that alcohol penetrated through the thin bony wall from the vestibule into the facial canal within 24 hours, although it was not to be found there immediately after the injection, and he accordingly makes the useful suggestion that the alcohol should be washed out after a few minutes by normal saline through the same apparatus. The cochlea, being a long tube connected with the vestibule at one end only, is less readily injected than the semicircular canals, and was found not to be infiltrated when a small quantity, 0·5 c.cm., of alcohol was used, although the canals were well filled. Mr. Peacock thinks this of only theoretical value, because most of these patients suffer from tinnitus and this, if absent, might be induced by the injection which would in itself probably destroy any useful hearing. The tinnitus, however, is not likely to be cured by the injection; it persisted in his first case, and sometimes does so after section of the whole auditory nerve. Many of these patients have a useful degree of hearing in the affected ear; it is by no means certain that it will be destroyed by an injection which spares the cochlea and it seems to us worth while to try to do so. We hope that Mr. Peacock's investigation will be followed up by himself and others, for it offers a method of giving relief to these distressing cases with a minimum of surgical interference.

FERTILITY AND INTELLIGENCE

THOUGH the impending decline in the numbers of our population attracts most attention, some believe that differential fertility is a problem of nearly equal importance. Numerous studies have demonstrated an inverse relationship between fertility and social status; the less skilled and the more poorly paid the occupation the higher tends to be the fertility—though the larger size of the family thus produced tends to be reduced by a differential mortality. This association must naturally be interpreted as denoting an inverse relationship between fertility and intelligence. Direct attempts to measure the strength of that latter association have been made less often, and some of those made have not been above reproach as regards their sampling technique. It is certainly difficult in the field to eliminate bias, but the difficulty appears to have been overcome in an excellent study reported by Fraser Roberts, Norman, and Griffiths.[1] The group of children they investigated represents an almost complete sampling, by age only, of the entire population of the city of Bath. The intelligence of each child was tested, sometimes by more than one scale, and from the results there is no reason to suppose that the population of this city differs materially from that of other urban areas. Here, between the intelligence of the child and the number of living sibs that he or she has, there is a significant and negative association (a correlation coefficient of −0·224). Intelligence falls steadily as the number of sibs increases from 0, and similarly the number of sibs falls steadily as intelligence increases from the lowest levels to the highest. On this large sample there is no hint of anything other than the simplest straight line relationships—no indication, for instance, that fertility falls again as the lowest levels of intelligence are reached. It cannot, however, tell the whole story, for celibacy and childless marriages do not come into the sample. The public and private schools were found to contain children whose average number of sibs was very small—too small, in fact, to ensure the survival of the section of the population from which they are drawn. Further, the number was far smaller than would be expected on the basis of their superiority in intelligence to the general population, which is a clear indication that even for the same grade of intelligence there is still a considerable association between fertility and social class. This, and other points, the authors hope to explore in a further study of their data.

[1] Roberts, J. A. F., Norman, R. M., and Griffiths, R., *Ann. Eugen., Camb.* January, 1938, p. 178.

HEART FAILURE AFTER PULMONARY EMBOLISM

ALTHOUGH it has been said that quite large areas of the pulmonary circulation may be blocked without seriously disturbing the general circulation, we know that even a small pulmonary embolism in man often causes death by heart failure in a few hours. The explanation of these deaths is not clear, but it has been suggested that a pulmono-coronary reflex involving spasmodic occlusion of the coronary arteries may account for them. This suggestion is supported by the fact that the clinical (including electrocardiographic) signs of a pulmonary embolism in man often resemble those of coronary occlusion. Hochrein and Schneyer[1] have inquired into the existence of such a reflex in experimental pulmonary embolism in dogs, by injecting sago granules into the subclavian vein and noting the reactions in the coronary arteries and main vessels. They found that blocking of even a small branch in the pulmonary circulation produced an immediate rise in pressure in the pulmonary artery, presumably from reflex spasm. This was sometimes accompanied by a fall in the aortic blood pressure and sometimes by a rise. In the coronary arteries the reactions were variable. In the left there was usually an increased circulation, but in the right there was often a diminution of blood flow due to a spasmodic constriction. The right ventricle, working under the burden of an increased pulmonary blood pressure, was then liable to suffer coronary insufficiency resulting in heart failure or ventricular fibrillation. The electrocardiographic signs were variable, but mostly indicative of a right-sided heart failure. Hochrein and Schneyer think these findings indicate that strophanthin and digitalis will probably be ineffective remedies in pulmonary embolism, and may possibly be harmful, since they are likely to increase the load borne by the right ventricle. They were unable to determine the mechanisms of these reactions but they could find no clear evidence of any vagosympathetic control, since severing the vagus and administering atropine and ergotamine tartrate did not interfere with the reactions. They were driven to the conclusion that something in the nature of an axon-reflex must account for the sudden heart failure in pulmonary embolism.

[1] Hochrein, M., and Schneyer, K., *Münch. med. Wschr.* 1937, 49, 1929.

SPECIAL ARTICLES

PSYCHONEUROSIS IN HOSPITAL PRACTICE

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In out-patient hospital practice the recognition of patients with psychoneuroses is important so that time may not be wasted in investigating and treating minor or imaginary physical disorders, and because correct diagnosis is essential for rational treatment. The fact that so many psychoneurotic patients attend with diagnoses of anæmia, hyperthyroidism, tuberculosis, heart disease, and rheumatism, for which they may have had prolonged treatment, is evidence that the diagnosis is still often overlooked.

This paper describes an inquiry made into the incidence of psychoneurosis among out-patients attending Guy's Hospital. Following Gillespie (1928) these points have been taken into consideration in making a diagnosis :—

(1) The *symptoms* themselves may, by their bizarre qualities and their dissimilarity to recognised organic syndromes, suggest their neurotic origin. Pains described as "twisting" or "tearing," sensations resembling "balls of fire" or "cold water dripping" inside, or "something moving under the skin" are examples. The feeling of persistent pressure on the vertex of the skull is known to be commonly psychological in origin; so are certain special symptoms such as "globus hystericus," or aphonia of adductor type. It is also recognised that a variety of symptoms distributed widely over the body can usually be accounted for only on a psychogenic basis. If there are in addition symptoms of the type usually associated with the expression of fear—such as trembling, palpitations, and feelings of weakness—the diagnosis of psychoneurosis is made extremely probable.

(2) The discovery of some source of *anxiety or mental conflict*, accompanying or immediately preceding the onset of symptoms, will lead one to suspect a psychogenic origin. Often such a history is elicited with ease, but sometimes it is only after the patient's confidence has been gained that any source of mental unrest is admitted. In other cases, again, though the symptoms are clearly psychogenic, no such history can be obtained.

(3) The *precipitation of symptoms*, such as fainting or palpitations, by minor emotional events is suggestive of their psychogenic origin. Such events included casual observance of weddings or funerals, "rows" at work, dramatic incidents seen at the films, street accidents or merely the excitement of meeting strangers, or being in a crowd. It must not be forgotten that certain organic ailments, such as angina pectoris, may be precipitated in similar circumstances.

(4) A history of *emotional disturbances*, sometimes described as "nervous breakdowns" but often masquerading under some title with a more organic flavour, often serves as a clue. It will usually be found that these illnesses have arisen at periods of mental stress. In men who are old enough a war neurosis is often encountered.

(5) There must be *no evidence of physical disease or abnormality sufficient to account for the symptoms* on an organic basis. Lack of such evidence, however, should never be regarded as adequate reason for diagnosing psychoneurosis unless there is also positive evidence of psychological disturbance. It is important to remember that a neurosis may be superimposed on an organic condition, possibly of a serious nature.

Intimately bound up with the development of neurosis is the character of the patient. It may be evident that he has a personality that would be a suitable basis for such a condition. That he is unduly anxious, unstable, and lacking in confidence may be observed in taking the history; the presence of nervous mannerisms and tics, the manner of conversation, and the whole bearing and appearance should be taken into consideration, though without attaching too much importance to them. Inquiry may show that character traits such as those mentioned have been present as long as the patient can remember. A partial explanation may be provided by asking about the environment of childhood days, the attitude adopted towards the patient by parents and brothers and sisters, and his to them, or the fact that he is an only child or the spoilt youngest of a large family. Physical defects of development may help to account for a neurotic attitude to life.

Even after conscientious investigation along these lines, the diagnosis remained doubtful in some cases —those with intractable pain for which no organic cause could be found, those with unexplained dyspepsias, and those with some source of worry which was nevertheless being faced so frankly that it seemed unlikely to be responsible for the symptoms complained of. Merely negative evidence of organic disease was never by itself regarded as sufficient for a diagnosis of psychoneurosis. In these cases further observation sometimes provided evidence enabling a definite diagnosis of organic or psychological disease to be made.

Incidence of Psychoneurosis among General Medical Out-patients

The cases here discussed had all been referred to general medical out-patients * by their medical practitioners for special investigation and opinion. Brief notes have been kept of the diagnoses made, the results of investigations, and often of the subsequent progress. It has however been impossible to obtain complete records in all cases, for often the patient did not attend after the first visit, and often he lived too far away.

In the course of investigating 1297 patients attending for the first time a diagnosis of "psychoneurosis" was made in 209, or 16 per cent. This may be regarded as a minimum figure. The majority of these had no recognisable organic abnormality, but in a few of them physical conditions of minor importance (such as postural defects, mild degrees of anæmia, or menstrual disturbances) were present in addition. Such a minor condition often appeared to serve as a stalking-horse for the undetected advance of the neurosis. In every case it was thought that the treatment of the psychological condition was of primary importance compared with that of any accompanying physical abnormality. No attempt has been made to assess the frequency with which gross organic disease, such as gastric ulcer or disseminated sclerosis is complicated by attendant neurotic manifestations, though such association is common.

Neurotic Disorders by Age and Sex

Analysis of these figures shows considerable differences in the frequency with which psychoneurosis was diagnosed at different ages and for the

* The figures given, therefore, do not take into account those cases referred directly by doctors to the psychological and neurological out-patient departments.

two sexes. The figures given in the accompanying Table refer to the last 950 subjects seen.

C = Number of cases. N = Incidence of neurosis (per cent.).

—	C	N	C	N	C	N	C	N	C	N	C	N
Ages (years)	*10–19*		*20–29*		*30–39*		*40–49*		*50–59*		*60–80*	
Males ..	41	10	80	25	76	12	91	11	100	6	65	3
Females ..	61	20	140	26	91	24	100	21	67	6	38	—

Neurosis was diagnosed almost twice as often in women as in men. The diagnosis was made in 20 per cent. of 497 women, and in 12 per cent. of 453 men. It is surprising that the figure for males and females is almost identical between the ages of twenty and thirty. At this age, however, the total number of women seen was almost twice as great as men, so that considerably fewer cases of neurosis were actually seen in young men than in young women. That the peak period for males should be at this time of life is not surprising, since the strain of daily life is then apt to be particularly heavy and in many ways greater than for women of the same age. Difficulties associated with employment are numerous; for instance, many young men feel forced to keep on with uncongenial work for fear of unemployment; progress is apt to be slow and disappointing; the responsibilities associated with married life, either in contemplation or its early stages, are great. After thirty, ideals become more adjusted to reality, the routine of a settled occupation becomes accepted as inevitable, and the stability that accompanies approaching middle age begins to exert its effect. Halliday (1935), in his figures referring to a group of patients selected somewhat differently, finds that the highest figures for men are between the ages of thirty-five and forty-four.

There is no rise in the incidence among women at the time of the menopause. This fact has also been observed by Halliday (1935) and Gillespie (1935). After fifty the incidence of neurosis becomes relatively insignificant for both sexes.

Symptoms

The symptoms of which these patients complained were so various that it has been thought impracticable to attempt to group them. It was uncommon for a single symptom to be the sole cause of complaint. Occasionally one symptom—such as difficulty in swallowing or frequency of micturition—was alone complained of; but even in these patients, general symptoms of the vague type referred to in the next paragraph were often admitted on further investigation.

Dyspepsias, characterised by flatulence, nausea, and feelings of fullness; headaches, commonly vertical or occipital and accompanied by a feeling of "dizziness"; and generalised pains, often with a curious mode of spread, were commonly encountered. Fainting attacks, anorexia, fatigue, insomnia, and "nervousness" were all given as leading symptoms by individual patients. Less commonly a frankly hysterical condition, such as weakness of a hand, or persistent vomiting were seen. Attacks of hysterical over-breathing, wrongly diagnosed as asthma, were seen in two patients; continuous sighing respiration in another.

Many patients complained, besides such symptoms, of palpitations, trembling feelings, sudden overwhelming weakness, and depression. These feelings would come on in attacks, often precipitated by some minor emotional crisis. Commonly they complained of these anxiety attacks with complete absence of any local symptoms. Insomnia was almost invariable, as was depression, which could, however, generally be ascribed to some definite psychological cause. Suicidal thoughts were uncommon.

The Precipitating Factor

Precipitating factors of psychological origin were discovered in 111 subjects out of 148 of whom full notes have been kept. In about half these patients there were two and sometimes three factors that appeared to be of almost equal importance in the precipitation of symptoms. These have been grouped under the following headings:

Anxiety dependent on physical and mental factors leading to inferiority feelings, classified as cases of constitutional inferiority	20
Anxiety due to morbid fear of disease, often associated with above	25
Anxiety following physical trauma or sudden shock	10
Anxiety connected with work	23
Anxiety dependent on—	
1. Unsatisfactory home life in single persons	18
2. Unsatisfactory social life in single persons	9
3. Difficulties connected with matrimonial engagement	11
4. Difficulties of married life	9
5. Health or death of relatives or friends	26
6. Miscellaneous causes	10

Of the remainder, some appeared to be cases of simple depression, which came on without any psychological cause as far as could be ascertained; some of these had had similar attacks previously from which they had recovered. These subjects appeared to be mild cases of manic-depressive psychosis. In others a fuller investigation into the mental condition would probably have led to the discovery of adequate mental cause, which had been repressed more firmly than in those whose precipitating factors have been analysed above.

The factors under each of these headings will be briefly discussed with illustrative case-histories.

ANXIETY DEPENDENT ON CONSTITUTIONAL INFERIORITY

Only subjects in whom such feelings of inferiority appeared to have been pre-eminent throughout life are included in this group. Feelings of inadequacy of minor degree are almost universal among the neurotic. Where additional environmental factors were present they were usually trivial and would have been quite insufficient to cause symptoms in a more stable personality.

The characteristic feature of the group as a whole was the chronicity of the condition, the frequency of similar breakdowns earlier in the history, and the refusal throughout life "to take a chance." In addition many of them were poorly developed physically, and some appeared to be mentally below the average. The following is an example:—

CASE 1.—A. B., aged 46, a bottle-washer when last employed, complained of giddiness and a feeling that his legs were giving way. He never actually fell down in these attacks. Physically and mentally he was below the average. He lived at home with his parents, with whom he was on good terms. He had never married because he had "never been able to afford it." Always a worrier, he had never been able to keep a job long. The present symptoms had become severe since he had recently become unemployed again.

In this man there appeared to be no severe emotional conflict and no real source of anxiety. His symptoms seemed to depend on his lack of confidence in his own ability.

Many of these patients had always been ailing as children, and life in childhood had often been unhappy.

Among the women in this group one had some degree of facial hirsuties, about which she was very sensitive, and one other was obese and unattractive. Of these 18 patients 12 were men and 6 women.

ANXIETY DUE TO MORBID FEAR OF DISEASE

Morbid fear of disease is an incident in the course of many neuroses, but in these cases it appeared to be a predominant factor in the precipitation of symptoms. In 6 of them symptoms had followed the discovery of some minor illness from which recovery had taken place. Thus C. D., a girl of 17, complained of suffocating feelings and attacks of palpitation that dated from the discovery of a slightly enlarged thyroid gland at puberty. E. F., a man aged 40, complained of frequency of micturition and vague general symptoms that dated from an attack of acute nephritis two years previously. No evidence of hyperthyroidism or renal disease was found in these cases. In both reassurance was followed by complete relief.

Illness in friends or relatives aroused a fear of disease in 6 patients. Thus G. H., aged 28, had had queer precordial sensations since a friend at work had died suddenly with cardiac failure. A still more striking case is the following:—

CASE 2.—I. J., aged 24, attended with a sensation of throbbing in the ears and palpitations. His father had died of heart disease. He was engaged to a girl with severe rheumatic valvular disease of the heart. He had given up athletic activities at first largely because his fiancée was unable to take any physical exercise, and later he began to fear that his own heart might be damaged if he exerted himself. There was no evidence of heart disease. The mental association between the condition from which his father had suffered and which was responsible for his fiancée's ill health was pointed out and he readily accepted the suggestion that his own symptoms were due to anxiety over her condition. The question of advisability of marriage to an invalid was an added source of anxiety. He was encouraged to take up some form of exercise. In a few weeks' time he reported that he was much better, and ten months later wrote to say that he was free from symptoms and leading an active life.

In 3 women of menopausal age a morbid fear of disease was prominent; 4 middle-aged men had a persistent fear of cancer, 2 being chronic hypochondriacs whose obsession had been present for a number of years.

ANXIETY ATTRIBUTED TO MINOR PHYSICAL OR MENTAL TRAUMA, NOT INCLUDED UNDER OTHER HEADINGS

This is a small and rather heterogeneous group of patients whose symptoms date from some mental or physical trauma. In 6 instances some form of injury, a blow in 2, a motor accident in 2 more were responsible. The question of compensation was undoubtedly maintaining the condition in 2 cases. In none was the injury adequate to give rise to an organic condition that could account for the symptoms, nor were these suggestive of an organic pathogenesis. A burglary, a fire, and a dental extraction had initiated symptoms in other cases. It is possible that some deeper complex, which was not elucidated, had been affected by these incidents, and was really responsible for the symptoms.

FACTORS CONNECTED WITH WORK

In 23 subjects anxiety was dependent on factors connected with occupation or lack of it. Other factors were also present in many. The group comprises 12 women and 11 men. In 3 only did unemployment account for the symptoms. This factor will naturally vary considerably with local labour conditions. Halliday (1935) in his survey finds it to be an important factor among men.

Actual dislike of employment was responsible in 7 cases; 2 of these were inadequate personalities who had hoped to rise to better positions of responsibility beyond their powers. In 2 cases, both women, inability to get on with employers or those directly over them appeared to be the important factor. Sometimes the responsibility or actual pressure of work seemed to have been sufficient to cause symptoms. Thus one woman had had symptoms since being put in charge of a machine which she did not understand, so that she was constantly in fear of an accident. Two patients were able to manage with the usual routine work, but at times when business was particularly brisk, necessitating extra work, symptoms developed. In others, prolonged hours of work, with the resulting fatigue and inability to enjoy any social life, appeared to be responsible. The following case illustrates the combined effect of uncongenial occupation and lack of social life.

CASE 3.—K. L., aged 20, was employed in an engineering firm. He complained of flatulence, fatigue, and a feeling of "can't be bothered." He did not like his work, and put down his failure to get a better post to the fact that he had failed in an examination for which he had done a lot of work. His home was in the north, and he had no friends in London; he found southerners difficult to get on with. It was pointed out that he might still obtain work he liked better if he made the effort, and at the same time he was encouraged to take up some form of exercise; he had previously played games but had given them up recently. When seen a month later he had carried out this advice, had made contact with some fellow north-countrymen in London and had arranged for a fresh job which he thought held more chance of advancement. He felt more vigorous and his dyspeptic symptoms had disappeared. Nine months later he was well and contented though he still had slight dyspepsia at times.

ANXIETY DUE TO UNHAPPY HOME LIFE IN UNMARRIED PERSONS

The subjects in this group are nearly all young. An unhappy upbringing is perhaps one of the most potent factors in the development of a neurotic personality, and is found as a background in the history of many neurotic patients.

The ways in which home life can be made unhappy for children and young people are numerous. The constant quarrelling of parents was an evident source of tension in 5 cases. Alcoholism on the part of one parent, actual maltreatment by father or mother, and a feeling of neglect were encountered in 1 case each. In a boy of 12 who was nervous and somewhat backward for his age, constant jeering and nagging by the father had led to neurotic symptoms. In one case overwhelming solicitude on the part of the parents had been predominant in causing chronic invalidism. The following examples illustrate two ways in which unhappiness at home may lead to symptoms.

CASE 4.—M. N., aged 25, complained of headaches and a feeling of dizziness which was not true vertigo. He had not felt well for six months and the headaches had come on recently almost daily. His parents, with whom he lived, had never got on well together. He was in constant fear of family quarrels. His symptoms dated from a severe disagreement between them, in which he had been involved. The headaches always came on while he was in the tube on the way home from work. This young man was an only child, very dependent on his parents, and below the average intelligence.

CASE 5.—O. P., aged 16, also complained of headaches which had been present almost continuously for four years; these were vertical in distribution and lasted throughout the day. At first no source of anxiety was admitted. Physical examination having failed to account for the symptoms, and the type of headache strongly suggesting a psychogenic cause she was again asked if anything was worrying her. She then admitted that she had for a long time been very unhappy at home, because her father had always disliked her and singled her out for abuse and criticism. After talking about her affairs she admitted that the headaches were always worse after clashes with her father. This girl appeared to be sensible, was in steady employment demanding more than the average intelligence, and appeared quite capable of dealing with the ordinary difficulties of life. Three months later, though she still had occasional headaches of short duration, she was very much improved.

ANXIETY DUE TO UNSATISFACTORY SOCIAL LIFE

In no case in this group was unsatisfactory social activity the only factor to which the symptoms could be attributed. Unsatisfactory social life often depends to a great extent on an unsatisfactory home life, and 5 of the subjects included in the last group are also numbered in this. Neurotic patients are characteristically poor "mixers" because of their lack of confidence in themselves and inability to take a genuine interest in other people. It is therefore hard to say how far symptoms are due to lack of social opportunities or how far lack of social life depends on the neurotic personality. It was certainly probable that the unattractive manner and appearance of some subjects included in this group accounted to a great extent for their professed lack of interest in all forms of social activity, since in this way they avoided injury to their self-esteem. In 2 patients prolonged hours of work left them too tired and with too little time at the end of the day to take part in social activity. Loneliness was an important factor in the precipitation of symptoms in Case 3.

ANXIETY IN CONNEXION WITH ENGAGEMENT TO BE MARRIED

This appeared to be the precipitating factor in 11 cases. Illness of the fiancé, subconscious fear of marriage, and prolonged engagements were responsible in individual cases. In one case a woman, aged 31, was engaged to a man several years younger than herself, and this caused her considerable perturbation. In another, a woman of thirty-five had been engaged for some years with no date fixed for the wedding; in addition she disliked her employment as manageress of a laundry. In 3 cases there was antagonism between the patient and the fiancés' relatives, who disapproved of the match. In another instance a perverted friendship for another girl had led to the patient breaking off her engagement. Of the 11 patients in this group 10 were girls.

ANXIETY CONNECTED WITH MARRIED LIFE

This group consisted entirely of women. Unhappiness due to inconsiderate treatment by the husband, anxiety over family finances, unemployment of the husband, and sickness of the children are all recorded as emotional factors which have apparently precipitated symptoms. In 2 instances wives have been attempting to carry on with work which they had been doing before marriage, besides running their homes, until the strain became too much for them. Actual sexual maladjustment has not in my experience played an important part, but in such a small series of cases and in a somewhat superficial investigation of the present type its importance cannot be properly assessed. The following case is directly due to matrimonial discord.

CASE 6.—Q. R., aged 31, complained of constant weariness. A year previously she had been diagnosed as having neurasthenia following tonsillitis; at that time she felt weak, could not eat, and was very "nervy." A month before attending she had had a cold, with a productive cough and backache. Since then she had felt unwell and faint, her appetite had gone, and she had throbbing headaches. She also complained of generalised throbbing feelings, precordial pain and palpitations with trembling and twitching. She had had similar symptoms three months previously. Her husband was often out of work and in debt, and spent his money on his own amusement. He was completely inconsiderate and she had considered leaving him; but anxiety for the future of her four children prevented her. She had until recently been carrying on with her work as a treadle-machinist in addition to looking after her home. Examination showed no evidence of organic disease. She readily accepted the suggestion that her symptoms were due to her worries, possibly intensified by her recent cold. After staying at a convalescent home she felt much better, but three months later reported that she was irritable and depressed by her home worries.

ANXIETY DUE TO ILL HEALTH OR DEATH OF RELATIVES AND FRIENDS

Ill health of relatives may be the precipitating cause of neurosis for almost directly opposing reasons, which may even be both present together in the same patient. Thus anxiety for the welfare of a sick person to whom there are deep emotional ties may be directly responsible; parents may be worried over their sick children or wives over their husbands. On the other hand, the restriction of normal activities often necessitated by having to attend to an invalid relative is a not uncommon source of neurotic symptoms. The desire for a fuller life conflicts with the opposing duty of attending to the wants of the sick person. In 2 cases patients were also afraid of developing the conditions (insanity and heart disease) from which their parents were suffering at the time.

The death of relatives or near friends immediately preceded the precipitation of symptoms in 13 cases. In 4 the loss of one or both parents was responsible. In each case the ensuing insecurity was evidently an important factor. Of these 4 patients 3 were dependent individuals with very little initiative; the fourth was a child of 12, whose mother, the sole remaining parent, died suddenly in tragic circumstances. The death of husband or wife was responsible in 3 cases and of the fiancée in 1. In 2 the anxiety and strain of nursing relatives seemed to have precipitated symptoms after their death had occurred. The following examples are typical:—

CASE 7.—S. T., aged 23, complained of severe headaches. Recently these had been occurring two or three times weekly, and often caused her to faint. She also had palpitations and trembling sensations. The symptoms began soon after the death of her fiancé. On one occasion she developed symptoms while acting as bridesmaid to a friend. She also had severe symptoms while away on holiday; these developed on the day when she should have been married.

CASE 8.—U. V., aged 40, attended with jerky movements of head and hands. She had had similar symptoms as a girl of 15. She also complained of feeling exhausted after a quiet day, and had sudden feelings of panic. She had had these symptoms since her father's death eight months previously. She and her sister were entirely dependent on their father while he was alive, and were left with no money except what they could earn. The sister was at that

time earning enough to keep them both. The patient sometimes taught music but disliked doing so. The feeling of insecurity in one who had never had to fend for herself was clear; moreover, by persisting with her symptoms she avoided doing work she disliked, and threw the whole burden of their maintenance upon her more normal sister. Six months later, in spite of psychotherapy at another institution, her symptoms were worse than ever.

Discussion

The incidence of neurosis in general medical practice, as determined by the present observations, is in fair agreement with other published figures. Reynolds (1930), engaged in the practice of internal medicine in Boston, U.S.A., diagnosed psychoneurosis in 200 (21 per cent.) of 935 unselected patients. Ziegler (1931) questioned 80 general practitioners in New York and obtained from them an average figure of 20 per cent. Moersch (1932) reported a psychogenic factor in 44 per cent. of 500 patients, but in 32 per cent. a predominating organic condition was also present. Halliday (1935) reported that 33 per cent. of 1000 consecutively examined insurance patients, who had been specially referred to him in his capacity as medical referee, were cases of psychoneurosis. These were patients with chronic illness, about whose fitness for work their usual medical attendant was in doubt, and such a method of selection naturally favours a high incidence of neurotic illness.

Little is known of the primary causes of neurosis. It is recognised that both extrinsic (environmental) factors and intrinsic factors play a part. How much the neurotic type of reaction is determined by events in early life, and how far it is innate in the personality, is beyond the scope of this paper to inquire. It is clear, however, from even a superficial study, that the relative importance of extrinsic and intrinsic factors varies widely.

In the majority it was not difficult to decide whether the environmental or personality factor predominated. Cases of the former type have been called by some "situation neuroses"; but this term, I think, separates them too sharply from the "character" neuroses and suggests that these are distinct clinical entities, rather than cases at one end or the other of the same scale. The basic mechanism of causation is probably essentially the same in both groups. I have preferred to speak of major and minor neuroses to indicate the extreme types. Such a subdivision envisages the possibility of the minor neurosis developing into a major neurosis, and yet is useful since the prognosis is very different for the two groups. Some differentiation on a prognostic basis is of value since it is clearly impossible, as well as unnecessary, for all patients with psychoneurotic symptoms to receive treatment at the hands of a full-time psychiatrist.

MINOR NEUROSIS AND MAJOR NEUROSIS

The person suffering from a minor neurosis may be compared to one who has become intoxicated under exceptional circumstances, and the person with a major neurosis to the chronic alcoholic. In the former group the immediate source of anxiety is usually readily discovered, and the patient is able and willing to discuss it frankly; he usually readily recognises the causal connexion between such mental anxiety and the development of his symptoms, when the possibility has been suggested to him. The environmental factor is, as a rule, a potent one. The personal history may reveal little that is abnormal. School life, the difficulties associated with puberty and young adult life have usually been successfully encountered. A reasonable degree of resourcefulness had often been shown in overcoming minor difficulties. They are normally sociable people, capable of taking an interest in other people, and having interests of their own outside themselves. Such cases appear to have been overwhelmed by some severe emotional disturbance, which may either have been a sudden crisis or a long-standing source of distress that has eventually overcome the patient's resistance. Nevertheless it is highly improbable that such symptoms would have developed unless there was also the innate instability of temperament seen more strikingly in the next group. Cases 2, 3, 5, and 6 are of this minor type.

Among cases of major neurosis the personal history reveals that the patient has been abnormal in his social relationships and in his reactions to difficulties from an early age. Often solitary at school, he is a poor "mixer," avoiding social activities, largely from a fear of failing to achieve success. There is often a history of tics, enuresis, or night terrors in childhood, and of nervous breakdowns at other difficult periods of life. Minor difficulties such as would be dealt with in the course of everyday life by normal people are often sufficient to precipitate symptoms in these unstable subjects. Often poorly developed physically, they are solitary, uncongenial, nervous, and socially maladjusted; sensitive, compulsively over-conscientious, they are constantly aware of a feeling of inadequacy, and hence insecurity.

To the latter group belong those cases whose symptoms were attributed to "constitutional inferiority," among whom environmental factors were of little importance. Again those with morbid fear of disease were usually of this type. In a few cases, however, such a fear could be traced to some reasonable source and appeared to be an isolated event in an otherwise normal life. An example of this type is the patient whose symptoms dated from an attack of acute nephritis, and similar cases are not uncommonly met with among medical students, in whom a neurotic fear of disease may develop in the course of their training—the result of a little knowledge. Rapid recovery on reassurance is here the rule.

Those with symptoms dating from a shock or minor injury were also mostly inadequate individuals, the nature of the precipitating trauma being such that it would have been a passing cause of discomfort or distress in normal people. In this group particularly, but also doubtless among the remaining cases, it is probable that the apparent preventive cause is not the real one, and may act by uncovering a deeper and older complex. Among those whose symptoms were related to their work was an almost equal number of chronically dissatisfied inadequate people, who would have been incapable of success in any sphere, and those whom fortune had treated with more than common disfavour. Among the remaining groups, cases of minor neurosis predominated, but instances of intractable neurosis were encountered in every group.

TREATMENT

Although it has been impossible to treat more than a small number of these cases, it is evident that the prognosis differs widely in these two groups of cases.

The minor neuroses as a whole respond well to simple psychotherapeutic measures. A relatively brief inquiry into the patient's state of mind, during which he is encouraged to do most of the talking; a definite diagnosis with a simple explanation of the interaction of mind and body; and confident reassurance as to the absence of underlying physical disease

—these often suffice to give the patient some insight into his condition and may completely relieve him of his symptoms. Occasional further visits often help to establish the recovery more firmly. Of 16 cases of major neuroses, 10 of which had had previous breakdowns, and 6 of which had had persistent symptoms for a number of years, only 1 was free from symptoms six months after being first seen, 4 were improved, and 11 as when first seen or with fresh symptoms. Of 13 cases of minor neurosis, 5 were well and 4 much improved when seen again several months after the last attendance. In those who were not improved the precipitating cause was still persisting as a source of anxiety.

Such experience as I have had therefore confirms the view that whereas treatment of the patient with chronic symptoms of neurosis is relatively unsatisfactory, and requires prolonged treatment by trained psychotherapists, the simpler forms of neurosis associated with severe environmental precipitating factors often respond well to simple treatment. It may be argued that such patients would respond equally well to a sedative mixture and strong reassurance; but while this may be true for some cases, it is difficult not to believe that by giving these patients some insight into their condition one enables them to face reality more courageously, and with more hope of preventing recurrences. That in some cases such insight gives immediate relief from symptoms and some peace of mind is unquestionable, but that the effect of such treatment is more than temporary, no evidence can be offered at present. Persistence of the source of anxiety is naturally a hindrance to recovery, but in an intelligent patient complete recovery may take place in spite of it. On the other hand the patient can sometimes be advised to take steps that will modify or dispel such a source of anxiety; and here recovery may be speedy, though sometimes without much insight.

In hysterical conditions, dramatic cures may be brought about by forcible suggestion, though the patient has no insight at all into the cause of the condition. Such a case was that of a girl of 21 who had been unable to use her left arm since she had dislocated her wrist eighteen months previously. The reason for this hysterical persistence of loss of function was not discovered, but by insisting that she could use it quite well if she only made the effort, full power and movement returned immediately and no relapse has occurred two months later.

Summary

(1) Of 1300 patients referred to general medical out-patients of Guy's Hospital 16 per cent. were diagnosed as cases of psychoneurosis.

(2) The incidence of psychoneurosis was highest between the ages of 15 and 30 in both sexes.

(3) Nearly twice as many women were affected as men.

(4) The sources of anxiety responsible for the precipitation of symptoms have been analysed, and examples given.

(5) Many cases of neurosis of a mild type respond well to simple therapeutic measures.

My thanks are due to Dr. R. D. Gillespie for his criticism and encouragement.

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MEDICINE AND THE LAW

Aphasia and Testamentary Capacity

IN the February *Practitioner* Dr. Macdonald Critchley writes discerningly on the testamentary competence of a patient suffering from aphasia. Since the classical papers by du Saulle in 1882 and by Byrom Bramwell in 1897, fresh progress has been made in the study of a disorder which is often not an isolated phenomenon but may be accompanied by definite change in mentality and conduct. Even the layman can appreciate that aphasia complicates the task of assessing the state of intelligence. The medical man may be asked to give his opinion whether the patient on some date in the past fully understood, or to-day fully understands, both printed and spoken words. If the patient has this complete understanding, his answers "Yes" or "No" to questions may not be conclusive; he may mean the one and say the other; gesture—e.g., the vigorous nodding of the head—will be a safer guide. In his discussion of various aspects of the problem Dr. Critchley naturally mentions the case of Moore *v.* Moore which came before Sir Francis Jeune in 1900. Arthur John Moore, M.P. for Londonderry City, propounded the will of his deceased sister. She had a paralytic stroke in July, 1898, and was left a victim to aphasia. Her doctor advised her that she ought to make her will, and she thereupon sent for her solicitor. She had lost the power of coining her thoughts into words, but her medical and legal advisers hit upon a simple plan for ascertaining her wishes. They prepared two packs of cards, one containing the names of her various properties and possessions, the other containing the names of her relatives. The patient "dealt and sorted her cards" and the plan succeeded admirably. The solicitor played the card, for instance, of her Ballycoby estate, and she played on it the name of the relative whom she desired to inherit it. The solicitor then "turned the trick." Play proceeded until all the property was allotted. There were two difficulties. First, the arrangement did not provide for her leaving anything to a charity or to a friend whose name was not in the pack. Secondly, she had to choose an executor and, at the first attempt, she rejected all the candidates whose names were in her hand. Other names were written on cards, but she was still dissatisfied. Finally, she threw down the card with the name of her brother, Arthur John Moore. A will was at once drawn up and she was taken to have approved the results of the card-play and the choice of the executor, inasmuch as she next day executed the will after it had been read over to her. The president of the court said the case was novel and ingenious; no more fair or skilful method could have been devised. He pronounced in favour of the will. To anyone reading the report of the case to-day it all sounds easy. Perhaps the medical practitioner cannot expect always to find so entertaining a solution.

IRELAND

(FROM OUR OWN CORRESPONDENT)

CONDITIONS IN THE DISPENSARY MEDICAL SERVICE

THE Irish Medical Union has lately drawn public attention to the grievance under which medical officers of the dispensary medical service suffer in the inadequacy of the salaries in relation to modern conditions. The council of the Union has an addi-

tional grievance in the refusal of the Minister for Local Government and Public Health to receive a deputation to discuss the matter. It is pointed out that although they are classed and paid as part-time officers many of the dispensary doctors are in fact whole time, as they are on duty day and night, and in some cases the work is so continuous as to leave no time for private practice. It is noted that in recent years private practice, especially in the country, has become less remunerative, and many patients of the farmer class who formerly got attendance as private patients now claim it on "the dispensary ticket." The council of the Union draws attention to the increased cost of living, the decrease in private practice, and the increased expense of medical education as reasons why salaries should be revised. It is also pointed out that whereas the salaries of whole-time officers are supplemented by a "cost of living bonus," the salaries of dispensary medical officers are not so supplemented. It is remarkable that even in cases where the local authorities recognise the justice of their medical officers' claims and are willing to grant increases of salary the Department of Local Government and Public Health refuses to sanction the increases.

While the Medical Union is pressing its case for improved salaries it has happened that both in Dublin and Cork proposals have been put forward by members of the local authorities for the substitution of whole-time for part-time dispensary medical officers. The case of Dublin and Cork is different in many respects from that of the smaller towns and the rural areas. In the cities the duties are so exacting that the doctor has little or no time left for private practice and is dependent entirely on his salary for his livelihood. One medical officer in Dublin complained to the board that in a busy time he was called on to make between thirty and fifty new visits each day after his dispensary hours, and he could only finish his rounds by working till midnight. Such a number of new visits means probably twice or three times as many actual visits as each patient has to be attended until his illness is at an end. It is doubtful whether the solution of the present difficulty lies in the appointment of whole-time medical officers, but there is no doubt that there is need for a greatly increased number of dispensary medical officers in both Dublin and Cork. The position of whole-time dispensary doctors would hardly attract men of high attainments or ambition, while on the other hand the manner in which a competent practitioner performs his public duties is often his best introduction to successful private practice. In the country districts there is no doubt that the prospect of a reasonable amount of private practice is what attracts many men to the dispensary service.

HOSPITAL CONVERSATIONS IN LONDON

IT will be recalled that the commission appointed by the British Hospitals Association, under the chairmanship of Lord Sankey, recommended the formation in each region of a voluntary hospitals regional council to correlate hospital work and needs in that region. The regional committee for the county of London is our old friend the Voluntary Hospitals Committee, which meets regularly on the first Wednesday in the month except during the summer holidays and sends a précis of its proceedings to all the constituent hospitals. It is now proposed to extend the area covered by this committee to correspond with that of the King's Fund, which will bring in 42 additional hospitals and nearly 3000 additional beds. The report for the year 1937 now before us contains two up-to-date maps of hospital accommodation in London, one showing the general hospitals, the other the special hospitals, distinguishing by colour alone which are under voluntary and which under municipal control. Including under L.C.C. beds only those actually used for sick persons their number is given at 35,393, compared with the 16,113 voluntary hospital beds—a figure including those in recovery and convalescent homes.

The King's Fund now requires all voluntary hospitals within the county to consult the regional committee about any proposed extension which will produce an important change in the amount, nature, total annual cost, or site of work done for in- or out-patients. This arrangement does not cover reconstruction, but the committee hopes that will not stand in the way of the same courtesy being extended in regard to new work. The decision of the London Fever Hospital to erect at once a modern isolation block was only taken after such consultation.

The scheme for admission of emergency and acute cases is now becoming a practical proposition. The proposal is that a record should be kept, at a central office, of beds available for such cases, and that doctors should be encouraged to telephone to this office when urgently wanting a bed. Before the central office can be established it has proved necessary to ensure that the admission of such cases at each hospital is controlled there by only one office, and the hospitals have been asked to see that this is done. There is little doubt, the report suggests, that such a central office would materially improve the relations between the hospitals and the public by assisting the medical practitioner to accommodate without delay a case which needs immediate hospital treatment and by saving the hospital the necessity of finding the house surgeon on duty. Another practical difficulty will be solved if the L.C.C. is willing to grant the same ambulance facilities for admission to voluntary hospitals as are available to council hospitals.

An outstanding issue on which the committee hope soon to be in a position to report is the provision of provident schemes in relation to hospital pay-beds in London.

LORD HORDER ON RAY TREATMENT.—At the opening by the Princess Royal of the extension of the Institute of Ray Therapy on Feb. 5th, Lord Horder, president of the Institute, said it was often asked what was the need for such an institution. Limited as they are by space and funds, the general hospitals' first concern must be with maladies which gravely menace life. Ray and electrical treatment can be provided more economically in every way at non-resident institutions. The coming of National Health Insurance drew attention to the lack of provision for minor ailments, which, though not serious, have an important effect on industry. The large increase in road accidents meant that hospitals could only provide for cases which were immobilised and in need of surgical attention. Panel doctors had neither the time nor the facilities for the after-treatment of these cases, and there was a gap between their discharge from hospital and their return to work when they received very inadequate attention. The Institute, said Lord Horder, fills this gap and provides the most modern methods for reducing the period of incapacity after accidents and for preventing minor ailments from becoming major.

PANEL AND CONTRACT PRACTICE

The February Health Campaign

A CIRCULAR issued by the London Public Medical Service draws attention to the fact that the February stage in the Health Campaign is intended "to encourage a wider use of the facilities available for adults and adolescents, in particular those relating to diagnosis and treatment of tuberculosis and venereal diseases . . . in both cases the objective is to encourage individuals to assist in finding out these diseases in the earliest stages and to take medical advice from the very beginning, from their own doctor, from the dispensaries and clinics of local authorities, and from the hospitals." The order in which the various means of obtaining medical advice are enumerated is significant. It is the family doctor who can direct his patients where he thinks they will receive adequate treatment, and—what is of vital importance—he can keep his eye on possible family contacts. In no part of his practice is the practitioner's tact and personal knowledge more essential. When referring a patient to the tuberculosis officer or to the V.D. clinic the practitioner is counselled by the L.P.M.S. always to send with him a note to the medical officer, and for two reasons: to demonstrate his desire to help the routine of the clinic, and at the same time to maintain his status as the family doctor. For reference to hospital a convenient form of hospital letter is available.

The L.P.M.S. takes this opportunity of urging members of the service to examine carefully all cases where there is a suspicion of tubercle. Insurance committees, London among them, have been worried by the large proportion of tuberculous cases which are not notified until an advanced stage of the disease has been reached. It is no doubt true that many of these have left it very late before consulting a doctor, but there is a suspicion that other cases are not diagnosed and reported as early as they might be. This has led to the practice in some quarters for health visitors to urge every person whom they hear coughing to see the tuberculosis officer, whether there is a doctor in attendance or not. The practice may be justifiable when the patient has no doctor and cannot (or will not) afford to get one, but it is quite unjustifiable when a doctor is available, as he is to L.P.M.S. subscribers and of course to all insured persons. It then strikes at the very root of the proper relation between patient and doctor. The health visitor should tell the patient (and be able to tell him with confidence) that his doctor will send him to the tuberculosis officer if necessary.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A HOSPITAL PHYSICIAN

III

IF the "voluntary" hospitals vary in efficiency, so (and more also) do those financed out of public funds. And without exception these suffer from disabilities peculiar to their development and administration.

The Local Government Act of 1929 transferred to the public health authority for the county or city all the institutions previously governed by the poor-law guardians, and for convenience sake it was accepted that the medical officer of health for the district should be the final executive authority, responsible to the elected councils for their conduct and coördination. There are four main types of hospital—i.e., general (covering the same field as most of the voluntary hospitals), mental, infectious, and those for the aged and incurable. Each institution has its own medical superintendent, who may or may not do some clinical work but whose chief function is administration. Upon the energy, intelligence, and integrity of this officer, and of the medical officer of health, depend the efficiency of the hospital and its coöperation with other institutions and with general practitioners. A good man sometimes makes, and a feeble one always mars, the whole system, which is highly authoritarian despite its democratic origins. In most other civil organisations—the business firm, the university, the school—there are public meetings of heads of departments and representatives of sectional interests to discuss problems arising in work, to collect information, to propose improvements, and to voice grievances. In the municipal hospital there are no such meetings. Criticism of administration or organisation is never invited and is almost always resented.

The medical superintendent of such a hospital lacks the daily experience of medical practice and daily contact with patients and their friends, nurses, porters, technicians, and all the different people who go to make a hospital population, to inform and guide him. He may, in fact, have never had such experience. It is a common fallacy to suppose that there are people, a species of super-men, who are born administrators, who can be relied upon for efficient organisation, and who are worth their weight in gold. The "born administrator" is a myth. Patient study and long experience, with constant invitations to criticise, may make a person into a tolerably good administrator provided he is not incapacitated by an overestimate of his qualities, but the only safe guide for local administration as for national government is the consent of the governed. The need for "taking opinion" is important also for new appointments, and the common practice of universities in this respect is a sound one—i.e., recommendation by a committee of office-holders of the same standing, with appointment by an independent body. Nepotism of some sort or other is almost inevitable, but it can at least be minimised by some such procedure.

The subcommittees of the councils, which are nominally responsible for government, are rarely well-informed, and often lack even the active interest that might make them so; they are preponderatingly cautious in outlook; they tend to accept at its face value the report of a complacent official or to

underestimate the importance of changes proposed by a progressive one.

* * *

Criticism and a moderate degree of publicity are the only guarantees of efficiency. An authoritarian administration is rarely efficient; it disregards the need for the constant expression of experience among its units, and leads inevitably to dissensions and cliques. Lack of opportunity for discussions and criticism allows personal antipathy to influence judgment and favours tolerance of the second best—tolerance even for real evils when their removal requires the coöperation of others, and this is denied.

At the best, the work of doctors and nurses, profoundly interesting as it is, is haunted by the fear of inadequacy in what is constantly a struggle between life and death, and by its constant personal contact is fatiguing to a degree probably only equalled, in regular occupation, by teaching. The knowledge that the struggle is prejudiced by removable obstacles, even though these be seemingly trivial, is worse than disheartening. It produces—especially under conditions of stress, as in an epidemic or when an exceptional number of critical cases form a heavy weight of responsibility—an irritation and underlying sense of irresponsibility which is prejudicial to proper judgment and to the detachment on which a vital decision may depend.

* * *

The obstacles to good work, however, are often even more serious. It seems that committees do not realise that the incidence of sickness, and therefore the numbers of persons needing hospital treatment, is not constant; or, if they do know this, they base their calculations on an average or even a minimum figure. The consequence is that few municipal hospitals avoid the danger of serious overcrowding from time to time, and they are apt to give their staffs an amount of work that seems ludicrous when compared with work demanded in a voluntary hospital.

The comparison cannot be a strict one, since with few exceptions the municipal hospital's medical staff is composed of experienced men and women who have no other obligations, whereas the voluntary hospital staff is composed partly of specialists who spend only a small proportion of their working hours in the hospital, and partly of junior residents. Nevertheless a general impression may be obtained from the following Table contrasting the medical staffs of voluntary and municipal general hospitals.

One must credit the voluntary hospital also with its student clerks, by whom the labour of record-keeping is largely undertaken. The physicians and surgeons of the municipal hospital, for the most part unassisted by juniors, are forced to spend much of their time attending to simple but necessary procedures that are carried out by the junior residents of a voluntary hospital, and to emergencies that are a constant interruption to orderly consecutive effort. They are, in fact, specialist, registrar, and house-officer combined. To conscientious medical officers in a municipal hospital life is anything but a bed of roses! It is to their credit, and an indication of the type of men and women now attracted to a salaried appointment, that the general level of work performed compares very well with that of voluntary hospitals of comparable size, and that some original work is achieved—in small but increasing amount.

HOSPITAL STAFFS AND WORK

(Figures taken from the "Hospitals Year Book" for 1935)

—	Beds (approx.).	New in-patients (approx.).	Out-patients (individuals) (approx.).	Medical.		Nurses.	Beds per unit of staff.	
				Honorary.	Resident or salaried.		Doctors.	Nurses.
V. 1	640	12,000	100,000	56	41	401	6·5	1·6
2	840	14,000	100,000	61	46	553	7·8	1·5
3	315	5,500	33,000	29	14	135	7·3	2·3
4	325	6,000	60,000	38	12	157	6·5	2·0
L.C.C. 1	1,300	8,500	2,000	..	11	300	118·0	4·3
2	800	8,000	4,000	..	8	250	100·0	3·2
3	800	7,000	13,000	..	8	254	100·0	3·1
P.M. 1	1,200	13,600	—*	..	9	346	133·0	3·5
2	520	10,000	12,000	..	16	248	32·0	2·1

* No figure available.

V. = Voluntary. L.C.C. = London County Council. P.M. = Provincial municipal.

V. 1 = London teaching hospital—St. Thomas's.
2 = " " " The London Hospital.
3 = Provincial teaching hospital—The Queen's Hospital, Birmingham.
4 = London non-teaching hospital—Royal Northern Hospital.

L.C.C. 1 = Lambeth Hospital.
2 = St. Giles' Hospital.
3 = Hackney Hospital.
(Some visits from part-time consultants.)

P.M. 1 = Withington Hospital, Manchester (some visits from part-time consultants).
2 = Selly Oak Hospital, Birmingham (the medical staff also serve an infirmary for the chronic sick, 636 beds).

* * *

State medicine and municipal medicine are words that often conjure up a vision of a semi-military organisation (admirable for those who like military drill, detestable to those who treasure their scientific and professional independence) in which the doctors are at the beck and call of a bureaucracy, robbed of initiative, and performing stereotyped work in an atmosphere of oppressive regulation.

Unquestionably such a nightmare is a possibility. In existing services the tendency to authoritarian organisation is already strong enough to show the extreme importance of individual freedom of action, according to professional ethics, and of the fullest self-government compatible with efficient team-work. With its vast influence the medical profession, turning from internal dissensions which thwart creative action, could establish an example of organisation for service on a democratic basis which would provide guarantees both against sectional domination at the expense of the public good, and against the subjection of the profession to bureaucratic rule.

Given a progressive rather than an over-cautious Ministry of Health the organisation of both preventive and remedial medicine on a regional basis, with only supervisory functions exercised centrally, has much to recommend it. It permits of competition in efficiency and can, with care, avoid many of the pitfalls of bureaucracy. Sudden upheavals are not to be desired, and it is by the relatively rapid development of municipal hospitals and clinics (in an association with voluntary hospitals so close as rapidly to obliterate competition and jealousy) rather than by any sweeping legislation which could force unwilling private practitioners into line, that reform must come. Little or no fresh legislation is in fact needed,

since the law already permits local authorities to develop their services in any direction that seems necessary.

Each municipality now has opportunity, under statute, to develop its medical services to any extent its council considers desirable. The payment of grants from the national exchequer is subject to the general approval of the Minister of Health, whose inspectors from time to time visit the hospitals; but the Ministry rarely acts as a definite obstruction. Yet so far there is scarcely any local authority that can congratulate itself on having used its powers in such a way as to provide the public with a service which is even reasonably complete.

A progressive authority is at present only hindered by the possible reluctance of the Ministry to contribute to cost, and by the fear of antagonising too bitterly the interests behind private and "voluntary" practice. In so far as these interests are legitimate, it is of course highly necessary to safeguard them, but there can be no doubt that they are in most quarters regarded with too great tenderness, and the "consultant" services with which so many of the newly organised municipal general hospitals are now being provided, consisting in occasional visits from private specialists with a roving commission, are quite different from anything which the older "voluntary" hospitals themselves have instituted, and far less effective. In the present stage of development, the obvious and safe departure is the institution of both full-time and part-time specialist services on exactly the same footing as regards status, responsibility, and their close association through joint advisory councils representing both types of appointment and both municipal and "voluntary" hospital.

CORRESPONDENCE

DISPENSING BY DOCTORS

To the Editor of THE LANCET

SIR,—Having been a regular reader of THE LANCET over a very long period I have observed, with no little pleasure, the sympathetic references you admit to your columns concerning the activities of the profession of pharmacy, to which I belong. I call it a profession although—because of circumstances to which I propose, if you will allow me, to call attention in this letter—an overwhelming proportion of the members of the confraternity is compelled by the need of making both ends meet to engage in a miscellany of retail trades, some of which have but the remotest relationship to the work the pharmacist is trained and educated to do. It is indeed doubtful whether there is any kind of shop where the stock is composed of so many articles which Diogenes could do without as is the chemist's shop. It is sad to reflect on this; to a new generation of pharmacists, required to pass examinations infinitely more exacting than those now of middle age had to pass, it is galling. The regulations require matriculation, two years' academic work, and an apprenticeship of at least a like period; and I sometimes wonder whether I have the moral right to call myself a "chemist and druggist," since the tests now applied to aspirants for that title are far above my head. No wonder that of late there has been a sharp fall in the number of students registered by the Pharmaceutical Society; the work is hard and the outlay in money considerable, for "neither Charon nor Pluto will do anything for naught." And the prizes are few.

A chemist's trade paper, in commenting upon the situation in a recent editorial article, said "the standard of education has raised the pharmacist far beyond the level of ordinary distributors, and the tragedy of it is that he is trained to practise a profession which at the present time cannot offer him anything but the most meagre reward." That is a melancholy statement and, with deference to the capable editor of the paper in which it appears, there is a hopeless sound about it which does not help those who are trying to make faint hearts grow stronger and send new warriors to the campaign. Not many years ago there was in Great Britain one chemist's shop to every 3000 of the population; to-day it is estimated that there is one to every 2000, and, since there is no reason to suppose that the demand for medicine is 30 per cent. greater than it was a few years back, it is clear that the average volume of the turnover of drugs in each pharmacy is conspicuously less than it was; but whether or not the public is better served by the present or the past ratio of shops to population are questions open to discussion. Other things being equal, it follows that the average practising pharmacist is more lucratively engaged when he has 3000 potential customers than when he has 2000, but there is no ground for assuming that the one in 2000 ratio is the ideal one, and it is certainly not established either by precedent or by any recognised law of supply and demand. In a few countries—Italy is a notable example—the number of pharmacies to population is limited by statute; but in the present conditions of practice in this country limitation by ordinance is not within the scope of practical politics, since there is no limit to the classes of goods which the owner of a chemist's shop may sell and no limit to the classes of shopkeeper who may lawfully sell everything the chemist sells with the exception of scheduled poisons. In Italy, where a limitation is placed on the number of pharmacies, there are limits imposed by usage, as unbreakable as those enforceable by the law of the land, on the types of retail transactions which are allowable to the pharmacist and to the shopkeeper respectively. Further—and this brings me to a point which, to my mind, is of supreme importance—in countries in which machinery exists for the limitation of pharmacies and in which custom dictates that pharmacists shall refrain from ulterior trading practices, doctors, save in exceptional cases, are forbidden to dispense medicines. Thus a comparison between pharmacy in certain continental countries and pharmacy in Great Britain is of little service since the conditions are so widely different. As long as I can remember, it has been a grievance of the pharmacist that much of the work for which he is specially trained is kept from him because many doctors dispense their own prescriptions. At times the chemists have been loud in their protests against this practice and, if I may say so, not without just cause. When I was in practice as a pharmacist I thought the competition was unfair and even now in the mellowness of retirement, and merely an onlooker, I still think that the cobbler should stick to his last, as far as possible. The chemist would be glad enough to stick to his trade if he could make a living at it; but if the doctor supplies medicines to his patients, the chemist is obliged to dabble in all sorts of gew-gaws in order to keep a roof over his head.

Fortunately there is plenty of evidence that dispensing by doctors is a steadily dwindling custom. It began to dwindle when the National Health Insurance Act came into force, and now, when something like fifteen million prescriptions are dispensed each year by panel chemists, doctors have become so accustomed to writing prescriptions for their panel patients that there is a distinct tendency on the part of those practitioners who formerly supplied medicines for their private patients to write prescriptions for them also. When, as seems likely to happen in due course, the benefits of the health insurance scheme are extended to the dependants of insured persons, there will be such a vast increase in prescription-writing that I doubt whether it will be worth while for many doctors to continue to keep an assortment of drugs for the use of patients who are not on the panel. Obviously, whatever happens, there must be no interference with the right of the doctor to supply medicine in cases of emergency and in out-of-the-way districts, and for my own part I do not think any law to compel medical practitioners to write prescriptions will be necessary: *solvitur ambulando*. It would be ungracious on my part, having asked for the hospitality of your columns, to suggest that the tendency on the part of the medical profession to discontinue the supply of medicines to their patients is wholly due to an accidental cause; by no means do I wish to infer any such thing, for I am strongly of opinion that the tendency had already begun before Mr. Lloyd George conceived his plan. The higher education of the pharmacist was beginning to tell long before 1908 and the medical profession had already perceived that a body of trustworthy and skilled men was available for the compounding of medicines.

The falling-off in student registration, to which I have alluded, is doubtless but a temporary phase, for the pendulum is always swinging. A new generation of pharmacists is coming along which is being taught that there are higher things than trade; they are being equipped with knowledge far in advance of that which former generations acquired and are becoming proficient in laboratory technique of a kind which will enable them to be the true handmaids of medicine; they will be able to help medical practitioners in many ways and medical practitioners can help them by ceasing to dispense medicines. The Pharmaceutical Society has been criticised because of the elaborate nature of the pharmaceutical curriculum; my prophecy is that in years to come the society will be praised for the prevision of those who have remodelled its educational policy.

I am, Sir, yours faithfully,

London, Feb. 5th. COBBLER.

DYSENTERY AND METADYSENTERY BACILLI

To the Editor of THE LANCET

SIR,—With reference to the interesting paper on Sonne's Enteritis by Drs. L. H. D. Thornton and E. M. Darmady, published in your issue of Jan. 1st, I should like to be permitted to make the following remarks.

(1) The organism known as "Sonne's bacillus" was described by Sonne in 1915. It is identical with *B. ceylonensis-A* described by me in January, 1907, and with *B. pseudodysenteriæ-E*, described by Kruse a little later in the same year. The identity of these three organisms has been demonstrated by Prof. C. F. Cerruti, chiefly by serological methods, using the original strains (*J. trop. Med. Hyg.* 1930, **33**, 207). According to the rules of nomenclature, the correct specific term for the organism is *ceylonensis-A*.

(2) Two closely allied organisms, slightly different in their biochemical reactions and completely different serologically, are *B. ceylonensis-B* (Castellani 1907) and *B. madampensis* (Castellani 1911). They form, with *B. ceylonensis-A*, the chief pathogenic species of a group of intestinal bacteria which I have named "metadysentery bacilli" and for which Cerruti has created the genus *Castellanus* Cerruti, 1930. These organisms, similarly to the organisms of the true dysentery group, or genus *Shigella* (*S. dysenteriæ* Shiga-Kruse; *S. paradysenteriæ* Collins, var. Flexneri; *S. paradysenteriæ* Collins, var. Hissi-Russelli), do not produce gas in any carbohydrate, but in contrast to them produce acidity in lactose and clot milk, although the acidification of lactose and the coagulation of milk may be very slow. The organisms of the metadysentery group are, I venture to think, of great practical interest, as they may cause very diverse clinical conditions. They are capable of causing dysentery, but may cause also a number of non-dysenteric syndromes, among which I may mention (*a*) an extremely chronic, almost symptomless colitis, which I have repeatedly described with the name of chronic metadysentery (a paper of mine on this condition was published in THE LANCET, 1929, **2**, 370); (*b*) obscure prolonged low intestinal fevers without diarrhœa; (*c*) subacute cases of fever with diarrhœa (non-dysenteric), which have been at times confused with paratyphoid. *B. ceylonensis-A* and *B-ceylonensis-B* were, in fact, first isolated from cases of this nature in Ceylon (*J. Hyg., Camb.*, January, 1907); (*d*) cystitis (Castellani and Mackenzie Douglas, *J. trop. Med. Hyg.* 1932, **35**, 337).

It must be noted that the group of anaerogenic intestinal bacilli, called by me metadysentery group, in addition to the pathogenic species above mentioned, contain non-pathogenic species, or species the pathogenicity of which has not been proved—e.g., *B. pyogenes Migula*, 1900 (=*B. pyogenes fœtidus* Passet, 1885); *B. colianaerogenes* Lembke, 1896; *B. gintottensis* Castellani, 1910; *B. bentotensis* Castellani, 1911.

I shall be glad to supply workers interested in the subject with the original strains of *B. ceylonensis-A*, *B. ceylonensis-B*, and *B. madampensis*.

I am, Sir, yours faithfully,

ALDO CASTELLANI OF CHISIMAIO.

New Orleans, Jan. 26th.

PROGNOSIS OF SCHIZOPHRENIA

To the Editor of THE LANCET

SIR,—Last week's leading article and Dr. Pullar Strecker's able assessment of the insulin and Cardiazol treatments provoke comment. No investigator has denied that the modern treatments of schizophrenia are followed by improvement in a large number of cases. Two points are controversial:

1. Whether all forms of treatment are not equally successful.
2. Which forms of schizophrenia respond to treatment.

(1) This point may be stated, "Is there not a common factor in all successful treatments?" We believe that there is. In all of them the patient is made to feel—to react to an environmental stimulus, to know reality. We would cite the removal of septic foci; pyrotherapy; hormonal therapy; altered states of consciousness with narcotics such as somnifaine, sodium Amytal; insulin; cardiazol; occupational therapy; psychotherapy. In all of these

treatments the psychosis is prevented from remaining an effortless equilibrium. Insulin and cardiazol offer a pre-eminently potent means of disturbing the psychosis as often as may be necessary. Their value is therefore incontestible, even if at a later date it be proven that their effect is not specific.

(2) The cases which do best are those in which there is still some reaction against the psychosis, in which there is not yet utter unremitting apathy. The more florid the psychosis, the better the outlook. Good results are sometimes obtained in apparently demented cases of some years' standing. These cases during treatment gradually uncover a psychopathological picture showing delusional and hallucinatory material which had been conscious originally and which was still attaining expression in the mannerisms, attitudes, and behaviour generally of the so-called dement.

We speak from an experience of sixty insulin and forty cardiazol cases treated in the male and female wards of this hospital since October, 1936. We are convinced that, whatever the rationale may be, more remissions are procured with these treatments than are ordinarily observed, and that these treatments should be available in every mental hospital.

We are, Sir, yours faithfully,

EDWARD LARKIN,
HUNTER GILLIES.

West Ham Mental Hospital, Feb. 13th.

CONTRACEPTION AND FERTILITY

To the Editor of THE LANCET

SIR,—The medical subcommittee of the National Birth Control Association has ventured to contest Mr. Green-Armytage's statement that contraceptive measures in the early days of marriage are inimical to pregnancy at a later date, and has declared its inability to find evidence in support of his statement. May I assist this subcommittee?

In the gynæcological and obstetrical monograph "Sterility and Conception" by Gardner Child (1931), it is stated on p. 89 that "where artificial means are used to prevent conception and are indulged in for any length of time they are quite liable to create a habit of sterility." In the *Transactions of the Medical Society of London* (1936, **59**, 120) Mr. Lane-Roberts says that "at times the endocervical secretion becomes hostile to spermatozoa because of the mechanical viscosity resulting from either poor cervical drainage or an endocervicitis," and on p. 130 he adds: "to take at random some infertility factors found in one series of one hundred cases, in the woman, in 28 per cent. endocervicitis was the factor." James Young, in the third edition of his gynæcology text-book (1933), states that chronic endocervicitis is a cause of sterility of uncertain importance; "it may prevent insemination by leading to an inflammatory blockage of the canal or by producing discharges which are hostile to the spermatozoa." Beckwith Whitehouse, in the fourth edition of Eden and Lockyer's book, writes: "There can be little doubt that the lesion (erosion), accompanied as it is with alteration in the amount and character of the cervical secretion, is a cause of diminished fertility."

It can hardly be disputed that the practice of contraception, with all its mechanical, chemical, and infective possibilities, is capable of causing chronic changes in the cervix uteri. Contraception involves finger insertion and handkerchief contamination must sometimes occur. The cervical canal is the Dardanelles of the genital tract, and any alteration in its state is inevitably brought to bear on the sperm attempting to win entrance.

One is led to wonder whether the National Birth Control Association, which can so lightly dismiss the expressed opinion of an experienced gynæcologist, has sufficient title to its discriminating function.

I am, Sir, yours faithfully,

GEORGE H. ALABASTER.

Welbeck-street, W., Feb. 14th.

To the Editor of THE LANCET

SIR,—When the secretary of the National Birth Control Association submitted her apologia in your last issue she picked out one line of a verbatim report and neglected to refer to the answer which I courteously supplied when she wrote to me on Jan. 25th. In equity I am enclosing for publication a copy of my letter to her which explains the reasons for the opinion held, with which many will agree, including an eminent gynæcologist who was present at the meeting and was also one of the official speakers.

The views of the medical subcommittee are not impressive for (*a*) presumably they deal mostly with patients who do not want more children, (*b*) statistics can be made to prove anything, and (*c*) they naturally are biased; whereas I was only speaking of the use of contraceptives before or in the early days of matrimony—clinical experience being of greater value than supposition.

I am, Sir, yours faithfully,

V. B. GREEN-ARMYTAGE.

Harley-street, W., Feb. 14th.

*** Mr. Green-Armytage encloses his reply to the secretary of the Association. It runs as follows: "In answer to your letter of the 25th instant I did use the words which you quote at the meeting of the West London Medico-Chirurgical Society, and my conviction is as stated for the following reasons: (*a*) That if the hymen is unruptured at the time of marriage, insertion of jellies or medicated pessaries upsets the physiological *p*H of the vagina with the result that the cervix is bathed in an acid medium far lower than *p*H 4 for some hours. The result is irritation of the external os with subsequent erosion and endocervicitis. (*b*) Should in the early years or months of matrimony rubber caps with a containing soluble pessary be applied to the cervix for a matter of 12 hours or longer, the resulting effect is the same as in (*a*). (*c*) I have noted this particularly during the last twenty years during which time I have seen over 800 cases of sterility. A large number of these have used (*a*) or (*b*). (*d*) In the discussion I stated that if for medical or other reasons contraception was necessary in the early months of matrimony, it should be relegated to the use of a condom by the husband and not by the insertion of chemicals of any kind by the woman. (*e*) It is of course well recognised and taught psychologically that the early and continued use of contraceptives, either by husband or wife, diminishes libido and orgasm in both parties. (*f*) I also referred to the statement by Prof. Miles Phillips which appeared in the *British Medical Journal* a few weeks ago, under the heading of 'Endometrioma' in a discussion at the North of England Gynæcological Society, stating the opinion that the early use of contraceptives was responsible for the increasing number of cases of endometrioma which are seen to-day in young people. (*g*) There are other moral and minor factors with which I need not detain you, but I think you will find that experienced gynæcologists, male or female, will agree with my statement that contraceptive measures in the early days of marriage are inimical to pregnancy at a later date."—ED. L.

A "LATIN TAG"

To the Editor of THE LANCET

SIR,—In your issue of Jan. 29th (on p. 281, a little after the cross-heading Should doctors be well educated?) Sir Walter Langdon-Brown refers to "The old Latin tag 'Who drives fat oxen must himself be fat.'" Will he give us the reference? In Boswell's "Life of Johnson" (Coker's edition. London: John Murray. 1848. Chap. LXXX, year 1784, June 14th) we read:

"Johnson was present when a tragedy was read in which there occurred this line—

'Who rules o'er freemen should himself be free.'

The company having admired it much, 'I cannot agree with you,' said Johnson, 'It might as well be said—

'Who drives fat oxen should himself be fat.'"

These are very nearly the same words, but there is no hint that the distinguished Latin scholar was citing a translation of a well-known Latin verse.

I am, Sir, yours faithfully,

Bristol, 8. E. WATSON-WILLIAMS.

GRAINS AND SCRUPLES

To the Editor of THE LANCET

SIR,—For months past I have looked forward to "Grains and Scruples" each week, and have seldom failed to derive therefrom instruction, stimulation, or entertainment. But there is a certain rancour about the contributions of A Hospital Physician which seems to me to be both unfortunate and unnecessary, and I feel that some of his statements should not go unchallenged. I can speak, of course, only for my own hospital, but I fancy that mine does not differ materially in the points at issue from other hospitals with medical schools. Let me take these points seriatim.

(1) "Until recently students in the medical schools were openly . . . advised against the choice of permanent salaried appointments; there was not only a professional but even a social caste convention that lent force to such advice."

No such advice was ever given, and "the professional and caste convention" is a delusion on the part of A Hospital Physician.

(2) "The public institution is often regarded with contempt and antagonism by the neighbouring voluntary hospital staff."

This is another delusion. My own hospital, like many other voluntary hospitals, works in close and cordial coöperation with neighbouring L.C.C. hospitals, and has nothing but admiration for the work done therein.

(3) "Nepotism undoubtedly often influences choice" (i.e., of new colleagues)". . . an additional staff appointment means another permanent competitor for fees . . . this competition is often the basis of the lamentable jealousy so often apparent between members of the honorary staffs of voluntary hospitals, and may lead to a complete absence of coöperation between two sections of a hospital."

I find it difficult to comment temperately on these ridiculous assertions. I can only say that at the hospital which I have the honour to serve all staff vacancies are advertised, and we endeavour to select the best candidate, whether trained in our own school or not. "Nepotism" is unheard of. The staff is constantly increasing in numbers, and it is my experience that when the work of a special department increases to such an extent that an assistant physician or surgeon to that department is desirable, such an additional staff appointment is invariably suggested by the head of that department, who does not appear to resent "another permanent competitor for fees." As to the "lamentable jealousy" and the "complete absence of coöperation,"—I am happy to say that these are non-existent.

(4) "The output of research work by clinicians in voluntary hospitals is now, in fact, not great."

I venture to suggest that the output of research work by clinicians in voluntary hospitals compares not unfavourably with that of clinicians in the council hospitals, in spite of the emancipation of the latter gentlemen from the drudgery of teaching "which contributes little or nothing to the understanding of disease"! to say nothing about their emancipation from the entirely gratuitous work, both in the hospital and outside it, which occupies at least half the working time of the consultant.

Finally I would add that if "conformity to upper middle class standards" may be interpreted as an ambition to doctor everybody honestly and efficiently, and to coöperate amicably and courteously with one's professional colleagues, well, I, for one, am all for it.

I am, Sir, yours faithfully,

Feb. 14th. VOLUNTARY HOSPITAL.

To the Editor of THE LANCET

SIR,—In last Saturday's issue of your journal an amazing statement is made in an article dealing with the dearth of money in voluntary hospitals. It reads as follows: "It is even the practice at one large teaching hospital in London to refuse admission to 'destitute' cases—i.e., those in receipt of public assistance—and to unmarried mothers, because the expense of their subsequent convalescence and 'social care' is considered prohibitive."

Such a state of affairs is incredible when it is the business of the almoner to deal with such cases without incurring unnecessary expense to the hospital. In both types of cases assistance can be obtained outside the hospital for the needed after-care. In the first instance, the National Council for the Unmarried Mother and the various branches of the Southwark Diocesan Association (Rescue Workers) will deal with the unmarried mother with her first baby. The public assistance committee are usually willing to help with convalescence, instruments, &c., for those in receipt of relief if a doctor's recommendation accompanies the application.

I am, Sir, yours faithfully,

E. V. SMYLIE,

Richmond-road, S.W., Feb. 15th. Almoner.

CAN DEATH CAUSED BY INJURIES RECEIVED IN A MOTOR ACCIDENT BE INSTANTANEOUS?

To the Editor of THE LANCET

SIR,—In the case of Morgan *v.* Scoulding recently tried in the King's Bench Division before Mr. Justice Lewis the plaintiff claimed as the administrator of his son's estate under the Law Reform (Miscellaneous Provisions) Act of 1934, damages from the defendant for the son's shortened expectation of life by reason of an accident which was due to the negligence of the defendant and resulted in the death of the son. By virtue of the said Act a right of personal action vested in a person at the time of his

death can be pursued by his personal representative. The negligence of the defendant was found to be the real substantial cause of the accident. The plaintiff's son was riding his motor-cycle at a high speed on a main road as he was entitled to do. The defendant brought his car on to the main road from a side road without due care so that the plaintiff's son collided with the defendant's car, and to all appearances was killed instantaneously, as would reasonably be supposed from the speed at which he was travelling. So it was contended for the defendant that no right of action survived to the plaintiff. But the Judge said that he could not go into metaphysical discussions. All that mattered was that the injury had occurred before the death. The cause of action was not the death but the negligence causing the collision. That happened before the death, although there might be a split second between the collision and the death. The cause of action arose before the death and the right descended to the administrator. The Judge accordingly assessed the damages for loss of expectation of life at £1000, which seems now to be the standard rate for a person of 23, which was the son's age. If this decision is allowed to stand it will add considerably to the risks undertaken by the insurance companies. It is submitted that the cause of action was not the negligence but the injury which resulted from the negligence, and though there is no mention of the medical evidence in the report of the trial, the inference from the judgment appears to be that there must always be an interval between the receipt of the injury and death, during which the right to recover damages vests in the injured person.

I am, Sir, yours faithfully,

London, Feb. 15th. N. C. MACLEOD.

DUNDEE AND ELSEWHERE

To the Editor of THE LANCET

SIR,—I have read with interest your Scottish correspondent's note entitled Midwifery at Dundee and am stirred to add a few statements on its contents.

The situation he has chosen for comment is merely one edge of the black cloud at present rising over the whole voluntary system of hospital service as it at present exists in Great Britain. No one who has seen hospital services in this country and in others need doubt either the efficacy or the efficiency of voluntary hospitals in Scotland; but few who have given thought to the problem of the economic position of this system in the present trend of British democracy can speak either convincingly or comfortably of its future well-being. It is only necessary to consider present-day State demands, both on earnings and capital, to realise that the fruitful springs that have so generously supplied these magnificent undertakings with their material requirements will inevitably become dry, and that at no far distant date. It is our duty therefore to recognise now what is happening and save for the future what to us is grandest and finest in our voluntary system. That the voluntary hospital system does possess elements that are finer than any non-voluntary system can ever hope to acquire is undoubtedly true. Its very isolation from all authority gives it an open door to healing not possible to any locally owned system or edifice. What has to be sternly guarded against at this phase in the life-history of the voluntary hospital is that fanatical adherence to this isolation does not lead to strangulation of the system both spiritually and materially. The future life and health of the voluntary system lies in wedding the spiritual grandeur of the system to the material strength of the State as vested in municipal and county authorities. Failure to bring about this union by our generation must inevitably mean that we are responsible for the loss of something fine which we might have handed on to our sons and daughters.

It is regrettable that your correspondent should have failed to grasp the fundamental factors that lie behind the striking success of the Highlands and Islands medical scheme. It is idle conjecture now to return to the days before this scheme of medical services came into being, and try to imagine what the voluntary system alone could have accomplished in these areas. Perhaps nothing at all. To-day the scheme is one glorious amalgamation of all forces concerned with the welfare of the health of the people. Shining amongst them with no uncertain brilliance are the voluntary bodies. Neither will that brilliance get less. It has been reborn through years of constructive toil, but reborn with the full strength of all health services with it and in it. In that lies its wonder and its future.

In Dundee there appear to be signs that the storm is breaking. Whether it passes to an era of sunshine in and around its hospitals and medical school depends on the wisdom, vision, and forbearance of all parties concerned.

I am, Sir, yours faithfully,

Feb. 12th. "INTERESTED."

THE HARLEY-STREET PURGE

To the Editor of THE LANCET

SIR,—Those of us who are in genuine consultant practice cannot help welcoming Lord Howard de Walden's "purge" of those general practitioners who use a consulting-room in the Harley-street district to enhance their local reputation. But this purge, of which the lay papers have made so much, is only a financial one and there seems nothing to prevent the rich semi-quack from renting a whole-time room while the poor genuine consultant who is struggling through the registrar stage possibly will not be able to make the first step towards a lucrative practice. Surely everyone must admit that it is ludicrous that it should be left to a private landlord —however influential—to adjust the standards of our professional practice.

Too often one finds that those who pose as consultants have nothing more than a qualifying diploma such as that given by the Conjoint Board and practically no experience. In most continental countries the law is such that none may claim to be a consultant who has not fulfilled a minimum period of five years' post-graduate study and passed a specialist degree. Cannot the law of England be brought into line with other countries so as to make a similar course of study and degrees (passed by examination—honoris causa degrees are justly suspect) essential? The genuine consultant could not possibly object to such a law.

I am, Sir, yours faithfully,

Feb. 12th. R. LEE STREET.

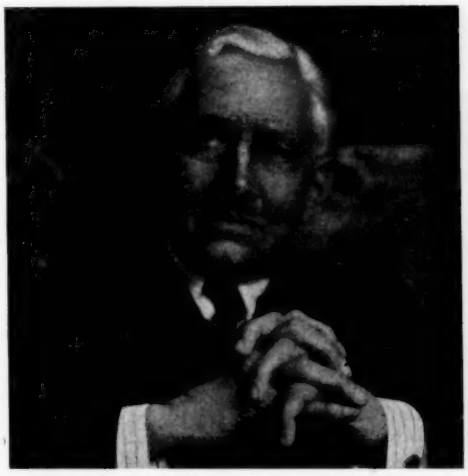
*** It is just two years since Mr. F. C. Goodall in these columns remarked: "It ought to be known to the public that 'Harley Street' is not a degree but an address." What the well-trained consultant really has to contend with, however, is the state of mind that prefers addresses to degrees.—ED. L.

OBITUARY

SIR TRUBY KING, C.M.G., M.B., B.Sc. Edin.

FOR the last few years Sir Truby King had lived in retirement in the grounds of his mothercraft home at Wellington, New Zealand, and he died there on Feb. 9th in his eightieth year. The word mothercraft is now familiar in every civilised country and it should not be forgotten that it was to Truby King that we largely owe the conception of motherhood as a craft and not a gift or an intuition.

Frederic Truby King was the son of Thomas King of New Plymouth, New Zealand, and started life as a bank clerk which he detested. He found his career at Edinburgh University, where he was Ettles scholar and graduated in medicine, going on to take the B.Sc. in public health. At the age of 30 he returned to New Zealand as medical officer of the Wellington General Hospital, and a year later he was put in charge of the Seacliffe Mental Hospital, near Dunedin, where his interest in feeding problems was aroused by observing the behaviour of young animals on the hospital farm. On a visit to Japan he was impressed by the sturdiness of the people and the general ability of Japanese mothers to nurse their infants, and he determined to try to improve conditions in New Zealand by instructing mothers in the rearing of children. In 1905 he and his wife began the work of instruction with the aid of Nurse McKinnon in a stable at Dunedin, and a committee of ladies soon joined him in forming the Royal New Zealand Society for the Health of Women and Children, later called the Plunket Society after the wife of the then Governor-General (now Lady Victoria Braithwaite), herself a pioneer in infant welfare. The society started at Truby King's house on the Karitane peninsula, the first patients being neglected illegitimate babies. Their satisfactory response to treatment attracted other ill babies and in 1908 the society moved to a house which is now part of the Karitane Harris Hospital at Dunedin.



The success of this venture in the following years led to Truby King being invited by Lady Plunket to visit England in 1918, where he became the first medical director of what is now the Mothercraft Training Society. Dr. R. C. Jewesbury, who took over the directorship when Truby King returned to New Zealand, writes:

"I first met Truby King in 1918 at the Mothercraft Training Society's centre at Earl's Court. I remember him as a man of slight build with a keen thoughtful expression and a strong sense of humour. He was versatile and widely read and his common-sense views on the feeding and management of infants, acquired by an immense amount of careful study, and the remarkable results which had been obtained in New Zealand by putting his methods into practice, suggested the adoption of similar methods in this country. Undoubtedly his greatest achievement was to prove beyond question the importance of breast-feeding, and to demonstrate how, with a definite technique, this can usually be successfully accomplished. In artificial feeding he was a believer in modifying milks to approach the human standard in composition, and of estimating the amount of feed by the child's caloric needs. The Truby King methods have been criticised by other workers in this field, but their best recommendation is to be found in the result of cases followed up in the past 20 years."

In fact, more than 25 years before the profession really began to think in terms of constructive hygiene and the education of mothers in the nurture of their children, Truby King was advocating methods that are even now more widely accepted than lived up to. "I now express," writes Dr. J. S. Fairbairn, "a personal tribute due to him for the most striking lessons of my professional career in applied physiology, obtained from his management of difficulties in lactation and the restoration of function after weaning. I had the good fortune to become closely associated with Truby King from the time of his arrival in England in 1917 by securing his services in charge of our infant welfare clinic, then in sore straits for lack of adequate medical supervision owing to the exigencies of the war. Some of us were needlessly concerned over possible reactions among the Lambeth mothers to one strange to them and ignorant of their casual ways. From the outset he gained their confidence and was welcomed by them in their homes, where he discussed their family budgets and other problems and acquired an intimate knowledge of them and their social background. The desire to get to the bottom of things by personal observation and the enthusiasm with which he threw himself for a few months into this work revealed something of the character of the man and his attitude to the problems of infant welfare. In spite of his frail physique Truby King had remarkable powers of close and constant application to the work in hand and when he took a break it was often a visit to see the work of other countries. Thus immediately the war was over he determined to investigate 'the greatest experiment of our time in infant malnutrition,' as he put it, among the countries of Central Europe, and as one of the British representatives at the inter-Allied Red Cross Conference he visited Austria and Poland to organise welfare work among the women and children. His success lay largely in his persistence and powers of hammering home the lesson he had to teach. 'The mother is the executive in the rearing of her family and you must work through her' was its keynote."

In 1919 he toured Australia to establish welfare centres there. He was appointed director of child welfare in New Zealand in 1921 and continued his mothercraft work until his retirement in 1927. It was a testimony to his efforts that the infant

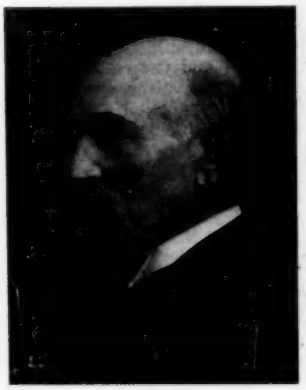
mortality-rate in New Zealand was halved between 1907 and 1928. He lived to see his centres imitated throughout the world.

Truby King married Isabella Cockburn, daughter of Adam Miller of Edinburgh, who was closely associated with him in his early work and died in 1927. He became a C.M.G. in 1917 and was knighted in 1925.

SIR JOSIAH COURT, M.R.C.S. Eng., J.P.

Sir Josiah Court died on Feb. 8th at Staveley in Derbyshire, where he had lived for 73 years, 50 of which he had spent in active general practice. As surgeon to the Derbyshire Miners' Association he established, in the face of opposition from all but the miners themselves, that miners' nystagmus was associated with defective lighting and was preventable.

Josiah Court was the son of John Court, a chemist, in Warwick, and was born in 1841. At the age of 14 he entered a shipping firm in Liverpool, but three years later he forsook this for the now defunct Sydenham College of Medicine. Later he moved to Guy's, where he qualified in 1863. Next year he bought a general practice in Staveley, where he rapidly secured the affection of the miners. In 1890 he undertook to investigate the causes of miners' nystagmus and carried out observations in Derbyshire, Durham, and Belgium, from which he concluded that the feeble illumination provided by the Davy lamps was at fault, rather than the position in which the miners worked. This led to a bitter controversy in which the mine inspectors, owners, and ophthalmologists were ranged against him, and it is said that when he read his paper before the British Medical Association at Nottingham in 1892 one well-known ophthalmologist refused to share his railway compartment. Professional opinion gradually veered to his side and he finally triumphed at the Oxford Ophthalmological Congress in 1923.



Sir Josiah was a staunch Conservative and six times unsuccessfully contested the Liberal, and then Labour, stronghold of the north-eastern division of Derbyshire. In 1865 he married the daughter of John Hyde, and he leaves three sons. He was knighted in 1920.

Sir Arthur Hall, a personal friend for many years, writes: "With the death of Sir Josiah Court at the ripe age of 97 there passes a great figure of the Victorian country practitioner at his best. Tall and handsome, with a kindly and genial manner, a thorough practical knowledge of his profession, and an abundant share of shrewd common sense, 'Court of Staveley' inspired confidence and retained it. He was the adviser and friend not only at the large country houses of the county families, but in the homes of the middle classes and in the cottages of the people. In each he was equally welcome, equally at home, and equally trusted.

"Reference has been made to his advocacy of improved lighting in mines, and although nystagmus has not yet disappeared, the value of his pioneer work must not be forgotten. That it succeeded is itself evidence of his determination and a tribute to his exceptional personality and character. Fortunate indeed is the place which secures for itself the life service of such a man."

Dr. CHARLES PARKER STEWART died very suddenly on Feb. 2nd. He had recently retired from the post of medical officer of health for Perth which he had held for 37 years. He was born at Perth and graduated M.B., C.M. with first class honours at Edinburgh University in 1893, taking his B.Sc. in public health in the following year. After being assistant medical superintendent at Croydon Infirmary, he was appointed medical officer of health and police surgeon at Perth in 1899. He was much interested in the problems of infant mortality and during his term of office at Perth did much to improve the health of the town.

PUBLIC HEALTH

The Maternity Problem of a Smaller Town

THE provision of adequate maternity services is comparatively simple in large towns where facilities are close at hand, but in the smaller towns various difficulties have to be overcome, one of the main ones being the decreasing obstetrical experience of general practitioners. In London in 1936, according to a recent report of the Voluntary Hospitals Committee, 67·7 per cent. of confinements were in institutions and only 20 per cent. were attended by independent midwives and doctors. In his paper to the Royal Sanitary Institute at Dewsbury on Feb. 11th Dr. J. F. Galloway, the medical officer of health, said that in that town (of 54,000 inhabitants) only 5 per cent. of mothers engaged medical practitioners for their confinements. The 23 practitioners resident in the town booked on an average two confinements a year each and no one booked more than ten. Including the cases which they attended at the call of a midwife five doctors saw an average of twenty cases a year, six between five and ten cases, and twelve saw less than five. Any complication which is beyond the scope of a midwife may require a doctor with special obstetrical experience, and Dr. Galloway considers that a doctor who sees less than ten cases a year cannot be said to have this. If the five who see most cases were formed into a panel to be at the call of the midwives, each would attend an average of from 25 to 30 cases a year, which would be sufficient to keep them interested and experienced. Membership of such a panel would clearly give a practitioner an advantage over his colleagues, and difficulties might arise where for example a newly arrived but expert practitioner sought admission to it. In Dewsbury a service of consultants, usually free of charge, is available and increasingly utilised, and Dr. Galloway suggests that the local authority should have upon its staff a skilled resident obstetrician, with whom the nurses are accustomed to work, to assist practitioners and midwives in emergencies pending the arrival of a consultant from a distance, and to carry out ante- and post-natal work. If the

opportunities for advancement in a municipal service were equal to those in the fever and other services, local authorities would find no lack of applicants of sufficient experience and skill.

Vital Statistics of 1935

The text volume for 1935 now issued [1] contains in addition to the customary routine analyses some special features of much interest. For example, infant mortality is examined in different groups of county boroughs, those which experienced a high total rate in 1935 being contrasted with those which experienced a low total rate, in order to determine which causes of death are mainly responsible for the great differences observed. The low rate of 31 per 1000 live births was registered in Oxford and Ipswich and the high rates of 94 and 98 in St. Helens and Wigan. In the group of towns with the lowest total rates, mortality from congenital causes (half of which are attributed to prematurity) is rather less than half the corresponding mortality in the towns with the highest total rates. Large numbers of these deaths therefore appear to be due to remediable causes. At the best rate there would have been 4135 such deaths in the county boroughs as a whole in place of the 6979 actually recorded. Other causes contributing to the excess in the worst towns are pneumonia and bronchitis, diarrhœa and other digestive diseases, measles, and whooping-cough, while violence varied but little. It is suggested that it ought to be possible for every northern town to achieve a rate below 50 and for every other town a rate below 40—which would mean an annual saving of more than 4000 infant lives in the county boroughs alone.

The tabulation of the causes of death depends to some extent upon rules of selection when more than one cause is entered upon the certificate. In 1935 a test was made of the effect upon the statistics of replacing these rules by a literal reading of the order of statement of the causes. It is reported that the proportion of certificates with unsatisfactory entries has now become small enough for the Registrar-General to substitute for the rules in most cases the doctor's opinion as to the essential cause of death. Arrangements are being made to carry this into effect from 1941.

In an analysis of mortality from tuberculosis since 1851 reference is made to the rise or arrested fall in the death-rate of young adults between, roughly, 1926 and 1933. These rates have been declining again in the last few years and it suggested that the earlier lack of improvement may have been the delayed results of the food shortage of 1916–18 operating on the children of the war years as they reached a dangerous age for the development of phthisis.

Maternal mortality, cancer, cerebro-spinal fever, and many other causes of death also come in for special consideration.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED FEB. 5TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2417; diphtheria, 1874; enteric fever, 69 (34 "expected"); pneumonia (primary or influenzal), 1128; puerperal pyrexia, 210; cerebro-spinal fever, 34; acute poliomyelitis, 6; acute polio-encephalitis, 1; encephalitis lethargica, 1; relapsing fever, 1 (Kendal); dysentery, 215; ophthalmia neonatorum, 102. No case of cholera, plague, or typhus fever was notified during the week.

Of the 69 cases of enteric fever 29 were notified from Somerset (Burnham 9, Bridgwater R.D. 20) and 19 from Pembroke (Haverfordwest). The remainder occurred for the most part singly in 9 counties as follows: Chester 1 (Stockport); Dorset 2 (Poole, Dorchester R.D.); Durham 1 (Whickham U.D.); Kent 4 (Chislehurst, Folkestone, Orpington, Rochester); Lancaster 1 (Salford); London 2 (Kensington, Westminster); Northumberland 5 (Newcastle 4, Longbenton U.D. 1); Nottingham 2 (Nottingham, Southwell R.D.); Surrey 2 (Barnes, Coulsdon); Port Sanitary Districts (Liverpool 2).

The number of cases in the Infectious Hospitals of the London County Council on Feb. 11th was 4562, which included: Scarlet fever, 845; diphtheria, 1357 (carriers 39); measles, 945; whooping-cough, 295; puerperal fever, 20 mothers (plus 9 babies); encephalitis lethargica, 282; poliomyelitis, 0. At St. Margaret's Hospital there were 21 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 1 (0) from enteric fever, 27 (3) from measles, 4 (0) from scarlet fever, 27 (5) from whooping-cough, 37 (4) from diphtheria, 68 (19) from diarrhœa and enteritis under two years, and 66 (8) from influenza. The figures in parentheses are those for London itself.

Exeter reported the only death from typhoid. Liverpool had 6 deaths from measles, Manchester 5. Liverpool also reported 8 fatal cases of whooping-cough, Birmingham 2. Diphtheria was fatal in 24 great towns, Liverpool and Birmingham each reporting 4 deaths, Newcastle-under-Lyme 3, no other great town more than 2.

The number of stillbirths notified during the week was 281 (corresponding to a rate of 41 per 1000 total births), including 29 in London.

THE LANCET 100 YEARS AGO

February 17th, 1838, p. 750.

A quotation from a letter addressed by Professor Elliotson to the Medical Faculty of the University of London, protesting against their proposal to split the course of lectures in medicine into two: first, general pathology and morbid anatomy; secondly, the practice of medicine.

The course which I deliver in *University College* consists of about 150 lectures, and 20 examinations. I commence with an account of what is meant by disease, and of symptoms; I examine the nature and operation of the various causes of diseases in general, and the general plans to be followed for their prevention, alleviation, and cure: all which is general pathology, and occupies a considerable time. I then proceed to the history, nature, causes and treatment of general diseases, or those which may affect various parts, such as inflammation and all its consequences, suppuration, mortification, &c., hæmorrhage, dropsy; and all changes of structure, whether common, as hypertrophy, atrophy, induration, softening, &c.; or specific, as cancer, melanosis, scrofulous tubercle, &c.; thus giving the fullest information on general morbid anatomy. After speaking of universal diseases, or those which are not seated in individual parts, such as continued, remittent, and intermittent fever, anæmia, scurvy, &c., I arrive at the diseases of individual parts; and, commencing with the surface, I proceed through the head, chest, and abdomen. In this division of the course I illustrate, by individual diseases, all the general principles and views propounded in the first division, and exhibit in detail the effects of the general diseases, formerly spoken of, upon each organ in succession,—the symptoms and the changes of structure induced; and, both in the first division and in this, I exhibit all the morbid preparations of our museum, and all the drawings of morbid anatomy made by Dr. Carswell, as well as numerous others, and engravings. . . .

[1] Registrar-General's Statistical Review of England and Wales for the year 1935. (New Annual Series, No. 15.) Text. H.M. Stationery Office. 3s.

REPORT OF THE CROYDON INQUIRY

Mr. H. L. Murphy, who with Mr. H. J. F. Gourley and Sir Humphry Rolleston as assessors constituted the Minister of Health's commission of inquiry, issued his report on Feb. 15th. He said :

The immediate cause of the outbreak was a portion of the public water-supply becoming infected by the typhoid bacillus. The infected portion was that derived from a chalk well at Addington. How that well became infected is a question that cannot be answered with absolute certainty, but all the circumstances and probabilities point so strongly in one direction that I feel justified in coming to a definite conclusion on the subject. That conclusion is that the well was infected by the fact that at the end of September and during October, 1937, men, one of whom was an active carrier of typhoid, were working in the well and that during large parts of such period water from the well, unfiltered and unchlorinated, was being pumped to supply.

Mr. Murphy then described the sources of the Croydon water-supply and its distribution by a high and a low level system. All the typhoid cases were within the area of the high level supply or had had opportunities of drinking the high level supply water, which came from the Addington well, and there had been complete unanimity amongst the scientific experts that this well was the cause of the epidemic.

Source of Infection

Dealing with the question of how the water from the Addington well became infected, Mr. Murphy said that between Sept. 24th and Oct. 28th 18 workmen were engaged in making certain alterations in the well to enable repairs to the pumping plant to be carried out. Between Oct. 16th and Nov. 3rd, in spite of this work in the well, its water was pumped to supply and owing to the mechanical arrangement of the plant neither the filters nor the chlorinating plant could be used.

The men were lowered into the well in a "skip" or foreshortened barrel, which was unpopular as having been the cause of a fatal accident in January, 1937.

The provision for workmen requiring to relieve themselves while in the adit, said Mr. Murphy, was this. An ordinary stable bucket was let down and kept in the adit. When, according to the evidence, it became half-full it was placed on, and bedded into, one of the loads of chalk going to the surface. . . . The actual work the men were doing was lighted by hurricane lamps. In what part of the adit the bucket was kept did not clearly appear. I am satisfied that the men were warned that if their bowels were moved they should come to the surface where there was adequate lavatory accommodation. I am also satisfied that in this long dark gallery where water was flowing there were ample opportunities, if a man were so minded, for the deposit of fæces and that there can have been no desire to multiply the daily journeys, up and down, in the skip. The typhoid carrier to whom I have already referred and who was, by common consent, described at the inquiry as 'Case A,' worked in the well with certain recurring intervals from Sept. 28th to Oct. 26th. . . . The dates of the onset of symptoms point to the original infection having taken place while the work was proceeding in the well and while the carrier was there. I have been supplied with charts, and I gratefully acknowledge the assistance I have derived from them, correlating the dates of the carrier's presence in the well with the dates of notification of the disease, the dates of the onset of symptoms so far as ascertainable, and the dates of infection, taking different periods of incubation. They all enforce the same conclusion. That conclusion is supported by the views on probabilities expressed by every medical gentleman who appeared before me and who was aware that the presence of a carrier in the well at the material time had been ascertained.

OTHER POSSIBLE SOURCES

Although he had come to the definite conclusion that the well had been infected, Mr. Murphy had had his attention called to other possible sources of infection. The state of the gathering ground at Addington was of importance as the soil was chalk covered with more or less permeable clay-with-flints, and it was now recognised that it was possible for water to flow through fissures in such a soil almost completely unfiltered.

If one was driven, said Mr. Murphy, to seek for a source of infection in this area one would look either at the farm known as Fisher's farm or at the site of a latrine used by workmen while building a school closely adjoining the well itself. . . . For the purpose of the inquiry a careful investigation was undertaken into the medical history of those occupying houses (and more especially houses relying upon cesspits) and farms upon the gathering ground. The result was that over a considerable time no case of typhoid had been notified or known in this area. In these circumstances I think it is safe to conclude that though the gathering ground undoubtedly contained potential sources of danger the actual infection of the well was not derived from it.

WORK IN THE WELL

Mr. Murphy said that although one of the pumping engines was badly in need of repair, the work was not urgent. It was quite possible, though inconvenient, to shut off the supply from the well while work was taking place and it was also possible to install a chlorinator at the Addington reservoir. Both of these measures had since been taken but neither was adopted at the time.

There was both misunderstanding and lack of communication between the responsible officers of the corporation in connexion with the work, said Mr. Murphy. Dr. Holden, the medical officer of health, was never informed that the work was being carried out at all. He was in complete ignorance of it until after the outbreak had taken place. It is true that Dr. Holden's duties did not include any direct responsibilities with regard to water, but he was sent monthly analyses of the water taken from certain of the wells and reservoirs. He had frequently made careful comments upon these analyses and had advised on the question of chlorination. I cannot help thinking that if Dr. Holden had been informed that men were working in the well and that simultaneously filtration and chlorination had ceased his advice would have been sufficient to put an end to such a state of affairs. His ignorance of the fact that chlorination had ceased may seem the less surprising when I go on to say that Mr. Boast, the borough engineer, who was the person directly responsible for the water-supply, was also in ignorance of it. At a meeting preliminary to the work being commenced between Mr. Boast, Mr. Brandram-Jones, the assistant water engineer, and Mr. Ellis, the mechanical engineering foreman in the Waterworks Department, it was brought home to Mr. Boast's mind that the proposed work would involve by-passing to a considerable extent the filtration plant. I am not satisfied that he then understood that it would involve a total by-passing of the filtration plant even when the water was being pumped to supply. He certainly never understood that it would involve elimination of the chlorinating plant. It was common ground between all three witnesses as to this interview that no mention of the chlorinating plant was made at all. . . . What is extremely difficult to understand is how (even in the

absence of any communication with the medical officer of health) it occurred to none of these gentlemen that the fact of men working in the well during a period when water was being pumped to supply afforded strong grounds for the stepping-up of the dosage of chlorination in contrast to its elimination.

HEALTH OF THE WORKMEN

Mr. Murphy pointed out that the men selected for the work were not of the regular waterworks staff but volunteers who were mainly usually engaged on sewer works, and therefore not familiar with the high standard of care needed in connexion with water. He had been told that they were carefully selected for physical fitness but could not understand how some of them could have been accepted on their appearance as physically fit.

Case A, in particular, he said, could not, in his opinion, have conveyed the impression of a healthy man. The important point is that there was no examination at all, however cursory, by the only class of person who would have been qualified to express any opinion of value upon the subject—namely, a member of the medical profession. It was present to the minds of Mr. Boast and his assistant that the state of the men's health was a matter of importance yet neither the medical officer of health nor any assistant of his was asked to examine them. Indeed, as I have already pointed out, the medical officer of health's department (situated in the same building as that of the borough engineer) was left in entire ignorance of the work being carried out at all. No one would expect that as a preliminary to this class of work there should be bacteriological tests made of the fæces and urine. When, however, there is no urgency about the work, a Widal blood test would appear to be a not unreasonable precaution.

SANITARY ARRANGEMENTS

Mr. Murphy found that the arrangements for urination in the well were quite unknown to Mr. Boast, who thought that he had directed that men should come to the surface either for urination or defæcation. There may have been some misunderstanding due to Mr. Boast employing the term "using the lavatory," but as things were the provision for urination in the well, in Mr. Murphy's opinion, gave no guarantee of safety. The most elementary care would dictate at least the use of a vessel which could be closed before being hauled to the surface. Although Case A had been shown to carry typhoid organisms in his fæces, the scientific evidence had established that more than half of fæcal carriers excreted organisms intermittently in their urine.

Mr. Murphy commented on the singular lack of attention that the gathering ground had received before the outbreak. In particular it was regrettable that a contractor's workmen engaged on corporation work had been allowed to dig a latrine almost directly above one of the well adits. It was also regrettable that the existence of privies at Fisher's farm had been ignored. Of these and other undesirable features of the gathering ground Mr. Boast had been ignorant before the outbreak.

I should say at once that Mr. Boast's duties as borough engineer covered so wide a range of matters as to make it impossible for him to give detailed personal attention to the highly important subject of water-supply. He was responsible for highways, lighting, drainage, housing, and many other matters. It may well be a matter for consideration whether in a borough of the dimensions of Croydon with its own water-supply that supply should not be under the direction of a fully qualified water engineer reporting to a water committee and keeping in close touch with the medical officer of health.

Steps Taken to Deal with the Outbreak

Consideration of such steps, said Mr. Murphy, might be naturally divided into two periods, the one before and the other after Nov. 4th, 1937, when the source of the infection had been ascertained and when the supply of water from the Addington well had been definitely stopped. The first period was a short one. On Oct. 20th notification was received of a typhoid case, now agreed to have been unconnected with the outbreak. . . . On Oct. 27th the first case arising out of the outbreak was notified, on Oct. 28th another case, and on Oct. 30th two further cases. On the same day Dr. Holden received a letter from a Mr. C. H. Rimington calling his attention to two further cases and stating, with considerable prescience, that even in these early cases other possible causes could be eliminated and that "the only common thing appears to be water." On Oct. 31st Dr. Holden and Mr. Boast were both present at a meeting of ratepayers organised by Mr. Rimington. Mr. Boast, Mr. Murphy remarks, was unaware until that day that any cases of typhoid had occurred in the borough, and he adds:

This undoubtedly arose from Dr. Holden having formed the view that the possibility of water being the cause of the cases which had been notified was comparatively remote. . . . There are a number of explanations of this. He had had the sporadic case on Oct. 20th; since then he had had only four notifications apart from the two mentioned in Mr. Rimington's letter. He was in complete ignorance, through no fault of his own, of the work that had been carried out in the Addington well and of the fact that chlorination there had stopped. There was nothing at the time to make him visualise the extent of the coming epidemic although there was sufficient to make him uneasy. Sporadic cases of typhoid, though happily increasingly rare, are still common in the experience of a medical officer of health whose area comprises a population of a quarter of a million. Up to July, 1937, from the beginning of the year, there had been ten notifications of enteric fever in the borough, nine of which were cases of paratyphoid, the less virulent form of the disease which is very commonly derived from articles of food contaminated by a carrier. Dr. Holden had, no doubt, in his mind the last substantial outbreak of typhoid in the country which was, in fact, found to be caused by milk, albeit the primary cause was the infection of the milk by water, though not from a public water-supply. At the same time I think it is proper to point out that Dr. Holden was under the impression that water was comparatively rare as a cause of recent outbreaks of typhoid. That impression was wrong. I had the advantage of hearing the evidence of Dr. Suckling . . . that even before it is possible to draw a line between the sporadic and the epidemical, water should be immediately suspected and if there is any priority in the course of examination for possible causes it should be given to water.

It was on Oct. 31st that Mr. Boast, now apprised for the first time of the existence of typhoid in the borough, telephoned to Mr. Brandram-Jones at the place where he was then engaged and received from him the surprising information that chlorination at the Addington well had ceased for a considerable period. Dr. Holden and Mr. Boast discussed the matter and as a result, on the morning of Nov. 1st, an adequate dosage of chlorination (0·18 p.p.m.) was applied to the Addington well. The facts point to infection having ceased from this date even if it had not ceased at a slightly earlier date, the carrier having left the well on Oct. 26th.

Mr. Murphy then referred to the visit, at Dr. Holden's request, of Dr. E. T. Conybeare of the

Ministry of Health, whose mind on his arrival on Nov. 3rd moved instantly to water as a possible source of the infection and one of whose first inquiries was whether the residences from which cases had been reported were all on the same water-supply.

It is remarkable, said Mr. Murphy, that there should not have been readily available in the borough engineer's office some map which would enable him or his assistants quickly to determine whether a particular house was on the high level supply or the low level supply. Armed with such a map on Oct. 31st Dr. Holden and Mr. Boast might have satisfied themselves of the fact that the first six cases notified were on the high level supply. It is an undoubted fact that the pipeline system in Croydon is extremely complicated, but it is hard to believe that its ramifications cannot readily be traced in the borough engineer's office.

Events after Nov. 4th are dealt with shortly, for the primary source of infection had then definitely ceased to operate. It was only from water in mains and cisterns originally supplied from the Addington well that any infection could possibly be derived.

It is to be remembered, said Mr. Murphy, that from Nov. 1st a measure of chlorination sufficient to destroy the typhoid bacillus had been in operation at the Addington well and that in the normally occupied house deriving its water from that source the cistern would, at the utmost, contain a day's supply and generally a good deal less. It is also important to bear in mind the short life of the bacillus except in environments quite different to a household water-supply. This question of household cisterns at one time bulked largely in the minds of my assessors and myself as a possible explanation of some of the later cases. We obtained a plan showing the 19 latest cases to be notified. . . . The plan showed that most of the houses concerned had small storage capacity varying from 17 to 26 gallons. . . . No less than 6 out of the 19 had no storage tank at all. . . . I have been driven to the conclusion that the continuance of any polluted water in the cisterns and storage tanks after Nov. 4th played no part in the epidemic. I do not, however, intend to minimise the general importance of this matter more especially with regard to houses that might be temporarily unoccupied. On Nov. 11th Dr. Suckling arrived in Croydon . . . one of his first recommendations was that water stored in unoccupied houses should be run off. . . . It seems to me, on the evidence, that this is a very desirable precaution and should be recommended at the very earliest possible moment after the water-supply is ascertained to be the probable source of infection.

Collaboration between M.O.H. and Practitioners

Mr. Murphy then turned to a matter of criticism which was to some extent related to both periods of the outbreak.

On Nov. 1st Dr. Holden, by letter, notified all the registered medical practitioners in the borough of the fact that certain typhoid cases had occurred in South Croydon. No details were given other than a general warning to keep the possibility of typhoid in their mind. It would be doing an injustice to the local medical practitioners to assume that, with this warning before them, they would not seriously consider the possibility of typhoid in any case of fever that they were called in to treat. That they would do so was stated in evidence which I accept, and indeed it seems obvious. On the other hand, there was uncontroverted evidence from the highest source before me that the clinical symptoms of typhoid vary in particular outbreaks and that the early symptoms can readily be mistaken for those attributable to other causes. The early manifestations sometimes seem to be not unlike those of influenza and they can be, and have been, mistaken for those of appendicitis. In addition, the remarkable diminution of typhoid in this century has deprived medical practitioners of any common acquaintance with the disease.

These facts seem to me strongly to enforce the view expressed by Sir William Willcox . . . that in all large areas there should be some committee representing all the local practitioners which, upon the occurrence of any outbreak, would be in constant and close touch with the medical officer of health and would provide the means of pooling and distributing all the information available from time to time as to symptoms and possible causes. For instance, in the present case, it would have been of assistance to the general body of practitioners for the purposes of diagnosis to know as soon as possible that water had been identified as the source of the disease. It is desirable to make two things clear:

(1) Sir William Willcox was not directing any special criticism at the corporation's medical services for lack of some such committee as this. On the contrary, he emphasised the fact that the absence of such a body was general throughout the country except in very few cases.

(2) Nothing in his evidence detracted from the fact that after the outbreak had taken place the sole responsibility for dealing with it rested with the medical officer of health and that he could not at the time of such a crisis be expected to act as chairman of a committee.

The view expressed by Sir William Willcox was a plea for some means of creating closer contact and more ready communication between the medical officer of health and the general body of practitioners, and part of the value of the suggestion seems to me that it might tend rather to easing than increasing the work of the medical officer of health during the course of an epidemic. I would observe too that a very large number of cases in this epidemic occurred on the very borders of the borough and that it was obviously desirable that contact and communication should be established between the medical officer of health and a slightly larger number of doctors than those with addresses in the Borough Directory.

[In order to avoid a possible source of confusion Mr. Murphy made it clear as a result of inquiry subsequently made that if Sir William had been aware of the fact that at the material dates there had been a typhoid carrier in the well (of which he was unaware through no fault of his own) his opinion as to the cause of the infection would not have differed from that of his medical colleagues.]

The Medical Officer Himself

The inquiry, said Mr. Murphy, had included a great deal of forcible, searching, and severe criticism of corporation officers. It was never suggested, however, that once a case of typhoid was reported it was not promptly, carefully, and skilfully dealt with. Nobody had had anything but praise to say of the hospital arrangements, the nursing, and the medical attendance.

I have largely dealt, he went on to say, with the conditions that caused the outbreak and with the detection of the source of infection. These matters must not be allowed to obscure the fact that the main task of the medical officer of health throughout the epidemic was the provision of accommodation for the sufferers and the treatment necessary to keep down the death-roll as far as possible. The burden in that respect cast upon Dr. Holden was, as it must inevitably be in a case of this sort, an enormous one and nobody suggests that he did not discharge it adequately and well. Counsel appearing on behalf of certain local medical bodies put forward, with considerable skill and moderation, an appeal for greater coördination between the medical health department

and general practitioners, but expressing the views of his clients, described Dr. Holden as "a loyal, able, and industrious servant of the corporation as well as a truthful and careful witness." With that expression of opinion I concur.

It appears to me that the only legitimate criticism that can be directed at Dr. Holden in this case is a slight delay in his realisation that "water" was or might be the cause of the epidemic. I do not think that until after Oct. 29th he had any reason for directing his mind to water. The two cases notified up to that date, like the earlier case on Oct. 20th, might well have been regarded as sporadic. On Oct. 30th he had two more notifications and the indication of two further cases, making six in all. I think by then his mind might well have turned to water but it is clear from the evidence as to what took place on Oct. 31st that he remained until then reluctant to consider water as a probability. As I have already said, it was on the morning of Nov. 1st that effective chlorination took place at the Addington well although Dr. Holden admitted that this was done as a precaution and not because the well was then suspected.

From these facts it will be obvious that any criticism of delay in attacking the Addington well supply must be based upon a period not exceeding two days, and I must repeat that Dr. Holden until Oct. 31st was ignorant of the fact that chlorination had ceased at the well. If separate samples of the well water were taken on Oct. 30th, as they were in fact on Nov. 3rd, the result would have been known at the earliest on Oct. 31st and could, at best, have meant the speeding up of chlorination by some hours. The dates of the various cases render it unlikely that any infection was caused by this short delay, and if I had to come to a conclusion upon the matter I should say that it was not.

The Addington Well

Nothing in his report, said Mr. Murphy, must be taken as suggesting that there was something dangerous about the Addington well. The epidemic arose from an avoidable and external cause and not from anything inherent in the well itself. In fact the infection was due to an unfortunate and rare coincidence of three factors:—

(*a*) Constructive changes taking place in the well.
(*b*) One of the workmen being a typhoid carrier.
(*c*) The process of chlorination being in abeyance.

With due attention to the gathering ground and suitable chlorination there was no reason why the Addington well should not provide a perfectly healthy drinking water. The evidence, however, makes me think, he concluded, that analyses of the water from these chalk wells should not be at such long intervals as a month.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

IN the House of Lords on Feb. 15th Lord STONEHAVEN introduced the Collecting Charities (Regulation) Bill, providing for the better regulation of collections for charitable, benevolent, or philanthropic purposes from house to house, or in places of entertainment or refreshment.

In the House of Commons on Feb. 15th the Housing (Financial Provisions) Bill, which is designed to further slum clearance work and the abatement of overcrowding, was read a second time by 258 votes to 137.

QUESTION TIME

WEDNESDAY, FEB. 9TH

Infantile Mortality in St. Kitts

Mr. RIDLEY asked the Secretary of State for the Colonies whether he was aware that the infantile mortality figures in St. Kitts was 300 per 1000; and what action he proposed to take with a view to reducing the high rate of infantile mortality in that island.—Mr. ORMSBY-GORE replied: The infantile mortality figure in St. Kitts, according to the 1936 Medical Report, was 164·1 per 1000. Active steps have been taken in St. Kitts in recent years with a view to reducing infantile mortality, which was as high as 245·57 per 1000 in 1926 and 204·7 in 1934. It will thus be seen that a steady reduction is being effected, and I hope that this will continue.

Malaria among Troops in Trinidad

Major MILLS asked the Secretary of State for the Colonies if he was aware that a company of the Sherwood Foresters was sent last November from Bermuda to Trinidad owing to disturbances there; that this company was sent to the Pitch Lake, and was obliged to live in bell tents from about the middle of November until the end of December while huts were being built for them; at whose instance these troops were sent to that hot and unhealthy spot; what percentage of the troops had suffered from malaria; and why such duties as they were asked to perform there were not carried out by the Trinidad constabulary and volunteers.—Mr. ORMSBY-GORE replied: Yes, Sir. The troops were dispatched to Trinidad at the Governor's urgent request and stationed by him at Brighton with a view to restoring confidence among the law-abiding and responsible section of the community in the Southern area of the island where confidence was lacking. I deeply regret that 31 cases of malaria occurred between Nov. 22nd and Dec. 26th. While the troops were under canvas the incidence of malaria was such as to cause concern, but since their accommodation in mosquito-proofed huts the detachment is living under conditions similar to those in which numbers of Europeans reside in the same area without loss of health, and the Acting Governor and his medical advisers are satisfied with the arrangements now made. As regards the last part of the question the dispatch of these troops was only authorised because the Governor considered that in the then circumstances the use of the police and local volunteers might be inadequate.

Major MILLS: Is the right hon. gentleman aware that the shade temperature in this locality in December is 90° F. and that in the model village referred to in the report of the Commission the white inhabitants, at any rate, live in mosquito-proof houses because the locality is so unhealthy?

Mr. ORMSBY-GORE: That may be so.

Captain HEILGERS: Were these troops provided with mosquito nets when they were sleeping in bell tents?

Mr. ORMSBY-GORE: I must have notice of that question.

THURSDAY, FEB. 10TH

Physical Training

Captain PETER MACDONALD asked the Parliamentary Secretary to the Board of Education whether it was within the scope of the bodies set up under the Physical Training and Recreation Act to encourage utilitarian exercise, such as assistance with agricultural reclamation work as well as games and straightforward physical exercises.—Mr. KENNETH LINDSAY replied: The adoption of suitable methods of encouraging physical training and recreation is one of the matters which the National Advisory Council would properly investigate, and on which they would advise His Majesty's Government, and I understand that, so far, the particular point raised by my hon. friend has not been considered. My noble friend does not regard the utility of any particular form of exercise as constituting in itself any ground for adopting or rejecting it; the overriding consideration is the extent to which it promotes physical well-being. It is, however, not one of the objects of the Government's scheme to provide the means of carrying out works of public utility.

Replying to questions by Mr. HEPWORTH and Mr. LEACH, Mr. KENNETH LINDSAY said: Grants have been approved by the Board of Education under the Physical Training and Recreation Act, 1937, in respect of eleven capital projects, including four swimming baths, three gymnasia, and four clubs, and many further projects are under consideration. Grants have also been made to the Central Council of Recreative Physical Training towards the training of teachers and leaders, and to fifteen other voluntary associations towards the development of their work for physical training and recreation. My noble friend is not aware that any difficulties have so far arisen in regard to the acquisition of land, and as regards playing fields, a substantial sum is being placed at the disposal of the National Playing Fields Association. The establishment of the area committees has now been completed, and my noble friend is glad to have this opportunity of expressing his appreciation of the coöperation of local authorities in the setting up of the committees and of the assistance which they have afforded in regard to the temporary arrangements which were necessary until the committees could be provided with the requisite staff and office accommodation. Now that the area committees are getting to work, my noble friend has every hope that rapid progress will be made in the development of the facilities which the Act was designed to promote.

Mr. SUTCLIFFE asked the Parliamentary Secretary to the Board of Education what progress had been made under the Physical Training and Recreation Act with the commencement of the physical training college.—Mr. KENNETH LINDSAY: The acquisition of a site for the National Physical Training College is at present actively under consideration. The Board are also considering the detailed accommodation which will be required to meet the various needs of the College.

Smoke Abatement

Mr. ELLIS SMITH asked the Minister of Health (1) if his department accepted the advice of the chief inspectors for dealing with the problem of smoke; and, if so, had any steps been taken to set up the suggested joint committee of the Stoke-on-Trent and Newcastle-under-Lyme corporations, as on page 14 of the seventy-third annual report by the chief inspectors, and to secure the employment of competent inspectors; and (2) if his attention had been directed to pages 13 and 14 of the same report; and what steps were being taken, or proposed, to put into effect the advice of the inspector.—Sir KINGSLEY WOOD replied: In accordance with the usual practice the suggestions made in the chief alkali inspector's report for dealing with the smoke problem in the Potteries have been followed up. The two corporations referred to, while they have not as yet seen their way to form a joint committee, have decided to adopt an active policy, and one of them has in fact instituted proceedings in a particular case. The technical suggestions in the report have been communicated to the corporations and to the research association of the industry who are investigating the matter.

Public Assistance Scales

Mr. ELLIS SMITH asked the Minister of Health if his attention had been drawn to the resolution passed by the Manchester public assistance committee that the present scales of relief were not adequate to meet fully the needs of recipients of relief; and if he would take steps to bring about a uniform increase throughout the country.—Sir KINGSLEY WOOD replied: I understand that the Manchester City Council have adopted a recommendation of their public assistance committee for certain increases in the rates of relief granted in the city. As regards the second part of the question I would refer the hon. Member to para. 6 of Circular 1662 of Nov. 22nd.

Private Sewage Systems

Sir JOSEPH LEECH asked the Minister of Health whether it was the practice of local authorities to require the registration with them or with his department of the exact positions of privately owned cess-pits, septic-tanks, and drainage tanks and systems, so as to guard against risk of the pollution of local wells and streams in the vicinity of drinking-water supplies by overflow, percolation, or flood water, notwithstanding chlorination.—Sir KINGSLEY WOOD replied: No, Sir. But local building by-laws require the position of cesspools, &c., to be shown on the plans submitted to the local authority.

Typhoid in Somerset

Sir FRANCIS FREMANTLE asked the Minister of Health the number of cases and deaths hitherto notified in the present outbreak of typhoid fever in the county of Somerset; and whether the cause had now been traced.—Sir KINGSLEY WOOD replied: 36 cases, 4 of them I regret to say fatal, have been confirmed. The source of the outbreak has not yet been determined.

Nutritive Value of Margarine

Major CARVER asked the Minister of Health whether, in view of recent criticism of non-vitaminised margarine, any investigation had been carried out by his department into the nutritive value of margarine that had or had not been vitaminised; and whether he proposed to take any action in the matter.—Sir KINGSLEY WOOD replied: No special investigation by my department has been made or is contemplated at present. The matter has already been considered by the Advisory Committee on Nutrition, who have recommended that, where margarine is used, it should be vitaminised, and this recommendation has been conveyed to local authorities.

Discharges from Mental Defective Colonies

Mr. KELLY asked the Minister of Health the number of patients discharged by the Board of Control from colonies for the mentally defective during 1936 and 1937.—Sir KINGSLEY WOOD replied: The number of patients discharged by the Board of Control from certified institutions under the Mental Deficiency Act, 1913, were: 152 in 1936, and 200 in 1937.

Physique of Naval Recruits

Mr. KIRBY asked the First Lord of the Admiralty the number of Liverpool men who presented themselves for enlistment into the Royal Navy during the year 1937, and the number who were rejected by reason of their poor physique during the same period.—Mr. DUFF COOPER replied: The number of candidates who applied for entry in the Royal Navy at the Liverpool Headquarters Recruiting Office during 1937 is 2439, and the number rejected over the same period, for the reason that they were below the physical and medical standard required, is 1137.

The Sale of Poisons

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary whether his attention had been drawn to the recent case at Croydon where an unqualified person was fined for selling certain tablets containing poison, and it was shown that he had acted in ignorance of the contents due to the fact that the tablets had been supplied by a wholesaler without any warning; and whether he would consider the desirability of making regulations placing upon wholesalers the responsibility of refraining from selling preparations containing poison to persons other than qualified chemists.—Sir SAMUEL HOARE replied: My attention has been called to reports in the press of two recent cases at Croydon in which keepers of drug-stores were convicted for selling a poison contained in Part I of the Poisons List, though the reports which I have seen do not altogether bear out my hon. friend's description of the circumstances. As regards the second part of the question, I would point out that the Act itself provides for the sale of certain poisons by persons other than chemists; and I do not think that it would be practicable to place upon wholesalers the responsibility for ensuring that the retailers to whom they supply poisons are, in fact, entitled to re-sell them. Wholesalers are required to label the containers of poisons with the name of the poison and certain other particulars, and so far as the present cases are concerned, I understand that this requirement was complied with.

Yellow Blackboards for Schools

Sir NICHOLAS GRATTAN-DOYLE asked the Parliamentary Secretary to the Board of Education whether his attention had been drawn to a report of an investigation by the National Institute of Industrial Psychology to the effect that the use of yellow blackboards with blue chalk was to be preferred to those at present in use; and whether he proposed to make any recommendation to local education

authorities in the matter.—Mr. LINDSAY replied: The question of the adoption of the recommendations of the report is one for the consideration of the authorities responsible for the schools.

MONDAY, FEB. 14TH

Anti-Epidemic Assistance in China

Mr. MATHERS asked the Secretary of State for Foreign Affairs whether the English-speaking group led by Dr. R. C. Robertson, appointed under the League of Nations plan of anti-epidemic assistance to China, had been fully constituted, and when it will proceed to China.—Mr. EDEN replied: The English-speaking group has been constituted under the leadership of Dr. Robertson, and is already in China.

Medical History of ex-Service Men

Mr. ORR-EWING asked the Minister of Pensions whether in future the full medical history of an ex-Service man whilst in any of the Services could be supplied to his medical adviser if such a man made a written request to that effect.—Mr. H. RAMSBOTHAM replied: The Service records are confidential. I could not, therefore, adopt this suggestion which would, in any event, involve a greater amount of labour that I should be justified in undertaking. It is, however, the practice of the Ministry to welcome any reasoned statement in support of the claim from the man's own medical adviser and I am always ready to give him an opportunity to discuss the case with a medical officer of the Ministry in his area.

Dairy Research and Nutrition

Captain ARTHUR EVANS asked the Minister of Agriculture when the report of the Milk Nutrition Committee would be published, including the result of the investigation conducted by the National Institute of Dairy Research on the feeding of calves on raw and pasteurised milk.—Mr. MORRISON replied: The Milk Nutrition Committee have already published one report dealing with experiments on rats at the National Institute for Research in Dairying, Reading, and at the Rowett Institute, Aberdeen. I understand that two further reports, dealing respectively with the work at these two institutions on the feeding of calves on raw and pasteurised milk and with an investigation into the effect of dietary supplements of raw and pasteurised milk on the growth and health of school-children, are in preparation and should be published shortly. The committee then propose to issue a final report dealing with their inquiries as a whole.

TUESDAY, FEB. 15TH

Report on Workmen's Compensation

Mr. CASSELLS asked the Home Secretary if he had yet received the Stewart committee's report on workmen's compensation; and, if so, was it intended that full copies of the evidence given and findings thereon would be available to Members of this House.—Mr. GEOFFREY LLOYD replied: This report is, I understand, being published to-day. It is not intended to publish the notes of evidence but hon. Members will find that the report contains detailed indications of the evidence as well as the committee's conclusions.

Tubercle-free Herds in Scotland

Mr. ROBERT GIBSON asked the Secretary of State for Scotland if he would explain why the county of Ayr had as many as 338 attested tubercle-free herds out of a total of 1618 registered herds, while the county of Renfrew had only 30 out of a total of 444, and the county of Midlothian only 10 out of a total of 271, respectively, the percentages being 21, 6·7, and 3·7; what were the number of cows in the said attested and registered herds, respectively; and what proposals he had with a view to increasing the number of tubercle-free herds in the counties of Renfrew and Midlothian, respectively.—Mr. ELLIOT replied: The high percentage of dairy herds attested as free from tuberculosis in the county of Ayr as compared with the counties of Renfrew and Midlothian is due to the greater response which has been made by herdowners in that county to the inducements offered by the Attested Herds Scheme as well as to the fact that dairying is generally more specialised and is of particular importance in Ayrshire. With regard to the last part of the question I would draw the hon. Member's attention to Part IV of the Agriculture Act, 1937, which confers extended powers upon my right hon. friend the Minister of Agriculture and Fisheries to initiate schemes for the eradication of bovine tuberculosis in Great Britain. These powers will come into operation at an early date. The numbers of cows in attested herds in the counties of Ayr, Renfrew, and Midlothian were respectively estimated at 10,834, 886, and 475 at Jan. 31st, 1938. The exact numbers of cows in registered herds in the same counties are not available but are estimated to be 47,000, 11,000, and 6500 respectively.

Dust Carts and Street Noises

Mr. ROBERT GIBSON asked the Minister of Health how many municipalities and other local authorities, respectively, there were under his supervision; how many of these, respectively, had dust carts with rubber wheels; and if he would consider taking steps to extend the use of such dust carts with the object of reducing the volume of street noises when the average citizen was asleep.—Mr. BERNAYS replied: There are 412 municipalities and 1083 urban and rural district councils. The great majority of the dust carts of these authorities already have rubber wheels and the use of them is still growing. My right hon. friend has no power to require their general adoption, but if the hon. Member has a particular case in mind and will supply me with the details, I shall be happy to communicate with the local authority concerned.

Public Health Services on Tyneside

Mr. DAVID ADAMS asked the Minister of Health what further steps he proposed to take with respect to the reports of the Royal Commission upon Tyneside local government.—Mr. BERNAYS replied: Following the conference held at Newcastle on Dec. 16th last, letters were sent to the Northumberland county council and the Newcastle city council suggesting informal exploration by the two authorities of the possibility of coördinating public health medical services. The city council have agreed to appoint a committee to consider the matter, and the county council will have the subject before them this week.

Appointments

BAXTER, A. B., M.R.C.S. Eng., Resident Medical Officer at the Infants Hospital, Vincent-square.

DOBERTSHAW, A. L., L.R.C.P. Edin., Resident Junior Assistant Medical Officer at the County Mental Hospital, Whittingham, Preston.

FIRTH, ERNEST, M.B. Manch., Medical Superintendent at the Ransom Sanatorium and Sherwood Village Settlement, Nottinghamshire.

FISHER, T. N., M.B. Manch., M.R.C.P. Lond., D.P.H., Hon. Assistant Physician for Children to the Manchester Northern Hospital.

HUBERT, W. H. DE B., B.A. Camb., M.R.C.S. Eng., Assistant Physician to the Department of Psychological Medicine at St. Thomas's Hospital.

NICHOLSON, B. C., M.D. Camb., M.R.C.P. Lond., D.P.H., Hon. Assistant Physician to the London Homœopathic Hospital.

STANDRING, THOMAS, M.D. Lond., D.P.H., Assistant Medical Officer of Health for Willesden.

THOMAS, F. B., M.B. Camb., F.R.C.S. Eng., Resident Surgical Officer at the Cardiff Royal Infirmary.

Births, Marriages, and Deaths

BIRTHS

SHARP.—On Feb. 12th, the wife of Dr. L. W. Sharp, of Wadhurst, Sussex—a daughter.

DEATHS

SHARPLEY.—On Feb. 12th, at Beechwood, Guernsey, John Ernest Sharpley, M.R.C.S., late of Kirton Lindsey, Lincs, aged 71.

SHAW.—On Feb. 14th, at St. Lawrence, Isle of Wight, George Henry Shaw, M.B. Glasg.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

MEDICAL NEWS

University of Oxford

Applications are invited for a Schorstein research fellowship in medical science.

The fellowship will be of the value of £300, and will be tenable for one year in any medical department or institute at Oxford. Candidates must be graduates of the university, hold a registrable medical qualification, and be under 35 years of age on Oct. 1st. Applications must be submitted to the dean of the medical school, University Museum, not later than May 2nd.

University of London

The following have been appointed staff examiners for medical degrees for 1938 :—

Anatomy.—Prof. C. M. West and Prof. J. E. S. Frazer.
Forensic Medicine and Hygiene.—Dr. J. H. Ryffel, Dr. W. H. Grace, Dr. G. F. Buchan, and Prof. W. W. Jameson.
Medicine.—Prof. Arthur Ellis, Sir Charles Wilson, Prof. W. H. Wynn and Dr. C. M. Hinds Howell; Prof. O. L. V. de Wesselow, Dr. George Hall, Dr. E. A. Cockayne, and Dr. K. Shirley Smith (associate examiners).
M.D. Hygiene.—Sir William Savage, Prof. M. Greenwood, F.R.S.; and Dr. William Gunn (additional examiner).
Neurology.—Dr. Macdonald Critchley and Dr. Antony Feiling.
Obstetrics and Gynæcology.—Prof. F. J. Browne, Mr. Frank Cook, Prof. J. McGibbon, Dr. J. M. Wyatt, and (if required) Mr. F. W. Roques; Mr. J. E. Stacey, Mr. R. A. Brews, Mr. Malcolm Donaldson, Mr. D. W. Roy, and (if required) Mr. D. H. MacLeod (associate examiners).
Ophthalmology.—Mr. C. B. Goulden, and Mr. R. Foster Moore.
Oto-Rhino-Laryngology.—Mr. W. M. Mollison and Mr. W. G. Howarth.
Pathology.—Prof. J. Shaw Dunn, Prof. W. W. C. Topley, F.R.S.; Prof. J. H. Dible and Dr. R. W. Scarff (associate examiners).
Pharmacology.—Prof. W. J. Dilling and Dr. V. J. Woolley.
Physiology.—Prof. H. P. Gilding and Prof. Winifred C. Cullis.
Psychological Medicine.—Dr. R. D. Gillespie and Dr. N. G. Harris.
Surgery.—Prof. J. Paterson Ross, Prof. P. T. Crymble, Mr. C. Jennings Marshall, Mr. C. E. Shattock, and (if required) Mr. C. W. G. Bryan; Mr. Julian Taylor, Prof. Lambert Rogers, Mr. A. C. Perry, Mr. R. H. Boggon, and (if required) Mr. Stanford Cade (associate examiners).
Tropical Medicine.—Dr. N. Hamilton Fairley.

Prof. G. E. Gask has been appointed a governor of Westminster Hospital in place of Mr. W. G. Spencer, who has resigned.

On Thursday, March 10th, at 5 P.M., at University College, Gower-street, W. C., Prof. P. E. Verkade, who holds the chair of chemistry and chemical technology in the Nederlandsche Handelshoogeschool at Rotterdam, will lecture on the rôle of dicarboxylic acids in metabolism. Dr. J. W. Trevan will give three lectures on variation in the response of animals to drugs at the Wellcome Institute for Medical Research, Euston-road, N.W., on dates to be announced later. These lectures will be open to all.

The Laura de Saliceto studentship for 1937–39 has been awarded to Mr. F. L. Warren, a Halley Stewart fellow working at the research institute of the Royal Cancer Hospital (Free).

University of Sheffield

Prof. H. S. Raper, F.R.S. (Manchester), has been appointed external examiner in pharmacology for Ph.D. theses in the faculty of medicine.

Hospital Almoners' Association

The annual dinner of this association took place on Feb. 5th, when Miss A. S. Macintyre presided. Sir Farquhar Buzzard, regius professor of medicine at Oxford University and president of the Institute of Hospital Almoners, in proposing the toast of The Association, spoke of the days before the introduction of almoners into the hospital and the difference that their coming had made to medical work. He spoke also of the future development and extension of this work and the possibility of the collected experience being a valuable contribution to sociological research. Mrs. A. W. Tomkins, assistant almoner at St. Thomas's Hospital, replied for the association. Mr. H. Chitty, hon. surgeon to the Bristol Royal Infirmary, replied to the toast of The Guests, proposed by Miss M. Streatfield, assistant secretary of the Institute.

Royal College of Surgeons of England

A meeting of the council of the College was held on Feb. 10th, with Sir Cuthbert Wallace, the president, in the chair. The Hallett prize was presented to Mr. Bertram Alfred Edward Johns.

At the recent primary examinations for the F.R.C.S. held overseas the following results were reported: At Melbourne, 17 out of 35 candidates were successful; at Sydney, 3 out of 6; at Dunedin, 7 out of 14; at Bombay, 11 out of 76; and at Cairo, 5 out of 15.

Mr. Sampson Handley and Mr. Graham Simpson were appointed as representatives on the Committee on the Geographical Distribution of the Industrial Population. Mr. Eardley Holland was reappointed representative on the Central Midwives Board.

The following hospitals of the Middlesex county council were recognised for the six months' surgical practice required of candidates for the final fellowship examination :

Central Middlesex Hospital, Acton-lane, Willesden (resident assistant medical officer (surgical) and junior resident A.M.O. (surgical));
North Middlesex Hospital, Silver-street, Edmonton (two A.M.O.'s and two junior A.M.O.'s with surgical duties); and
West Middlesex Hospital, Isleworth, Middlesex (two A.M.O.'s with surgical duties).

Diplomas of fellowship were granted to Frederick Charles Durbin of St. Thomas's Hospital, and Denis Frederic Ellison Nash of St. Bartholomew's Hospital, and diplomas of membership to those candidates mentioned as receiving the licence of the Royal College of Physicians in our issue of Feb. 5th. Diplomas in medical radiology were granted, jointly with the Royal College of Physicians, to D. M. Harper, Thomas Lodge, and J. T. McGinn.

On Feb. 28th and on March 7th and 14th Dr. L. W. Proger will describe recent additions to the museum. On March 4th, 11th, and 18th Dr. A. J. E. Cave will lecture on the anatomy of the tongue, the diaphragm, and the skin respectively. The lectures which are open to advanced students and medical practitioners will be held at the College, Lincoln's Inn-fields, London, W.C., at 5 P.M.

Health of Busmen

After the strike of London omnibus-workers last spring the court of inquiry recommended that further investigation should be made into conditions of work and their effect on the health of the men (*Lancet*, 1937, **1**, 1233; 1937, **2**, 87). A committee has now been appointed with two representatives of the Medical Research Council (Sir David Munro, F.R.C.S.E., and Mr. A. Bradford Hill, D.Sc.), two representatives of the London Passenger Transport Board, and two representatives of the Transport and General Workers' Union. The chairman is Mr. John Forster.

International Leprosy Conference

The fourth International Leprosy Conference is to be held in Cairo from March 21st to 28th. The first conference was held in Berlin in 1897, the second in Bergen in 1909, and the third in Strasbourg in 1923. A representative leprosy conference was also held in the Philippines under the ægis of the Leonard Wood memorial fund, in January, 1931, and this conference led to the foundation of the International Leprosy Association. The following subjects will be discussed at the Cairo conference: geographical distribution and statistics; clinical types and classification (including nature, diagnosis, and infectiousness of "tuberculoid" case; slight or early case); research (including cultivation and inoculation of the leprosy organism); general and special treatment; epidemiology (including influence of nutrition and hygienic conditions), methods of control (including voluntary and compulsory segregation); and miscellaneous (including rat and buffalo leprosy). It is expected that over one hundred non-official delegates from outside Egypt will attend the conference. Further information can be had from the hon. secretary-treasurer, International Leprosy Association, 131, Baker-street, London, W.1.

Miss M. Reynolds has been appointed matron of the London Hospital.

Hunterian Society

On Monday, Feb. 28th, at 9 P.M., Sir Frederick Hobday, F.R.C.V.S., will deliver the Hunterian oration to this society at the Mansion House, E.C. He will speak on John Hunter—pioneer of veterinary science.

Institute of Psycho-Analysis

On Tuesdays, March 22nd, 29th, and April 5th at 8.30 P.M. Dr. Edward Glover will lecture at the Institute, 96, Gloucester-place, London, W., on gastric and circulatory disturbances.

Sydney Ringer Memorial Lecture

On March 8th, at 5 P.M., at University College Hospital medical school, Gower-street, London, W.C., Prof. J. H. Gaddum, Sc.D., will deliver the twelfth Sydney Ringer lecture. He will speak on ephedrine. Sir Henry Dale, F.R.S., will be in the chair, and the lecture is open to members of the medical profession and to medical students.

Medical Peace Campaign

The annual general meeting will be held on Saturday, Feb. 19th, at Friends House, Euston-road, London, N.W., at 5 P.M. Dr. Adrian Stephen will take the chair. A report of the first year's work will be given, and there will be a discussion on future activities.

German Radiological Congress

The twenty-ninth congress of the German Radiological Society will be held from July 4th to 7th at Munich under the presidency of Dr. G. A. Weltz. Further information may be had from Prof. Karl Frik, Brückenallee 22, Berlin, N.W.87.

Course in Psychological Medicine

The second part of the course of instruction for the D.P.M. which is being given at the Maudsley Hospital, will begin on Feb. 28th. Further information may be had from Prof. F. Golla, hon. director of the medical school at the hospital, Denmark-hill, S.E.5.

Grenfell Association

On Tuesday, Feb. 22nd, at 3 P.M., Dr. C. H. Forsyth, who has been working for this association since 1931, will give a lantern lecture on medical work in Labrador and North Newfoundland. He will speak in the assembly hall of the Royal Empire Society, Northumberland-avenue, London, W.C., at 3 P.M., and there will be a collection for the work of the association.

Coördination of Newcastle Hospitals

The newly formed Newcastle Hospitals' Joint Advisory Board, representing the municipality, voluntary hospitals and King's College, was approved on Feb. 12th. The Board is to advise the constituent bodies on all matters affecting the hospital services of the city, both municipal and voluntary, so as to promote the best use of the available facilities in an efficient service for the city as a whole. They in their turn will consult with the Board when major issues are involved in any proposed action. Matters to be discussed include the provision of new in-patient, out-patient and casualty facilities and new bed accommodation, buildings, and equipment; the principles underlying the medical and surgical staffing of the hospitals concerned; financial arrangements between municipal and voluntary hospitals for services undertaken; and medical education and research. Lord Eustace Percy, rector of King's College, was elected chairman of the Board, and the personnel is as follows:—

City council: ten members and Dr. J. A. Charles, the medical officer of health.
King's College: Prof. R. Bramble Green, Sir Robert Bolam, and Mr. H. B. Saint, F.R.C.S.
Royal Victoria Infirmary: Sir Ralph Mortimer, Prof. W. E. Hume, Mr. F. C. Pybus, F.R.C.S. Dr. S. Whately Davidson, Mr. W. Cook, and Mr. J. H. Burn.
Hospital for Sick Children: Dr. W. MacMurray.
Princess Mary Maternity Hospital: Prof. R. P. Ranken Lyle.
Eye Hospital: Mr. L. H. Booth.
Throat, Nose, and Ear Hospital: Mr. S. Phillips.
Babies' Hospital and Mothercraft Centre: Dr. J. C. Spence.

In setting up this joint Board, Newcastle has followed the example of a number of other big provincial centres such as Manchester and Liverpool.

Medical Diary

February 21st to February 27th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY.
Medicine. 8.30 P.M., Dr. R. A. McCance, Dr. R. S. Aitken, and Dr. C. L. Cope: Mineral Salts in Therapy.
WEDNESDAY.
Comparative Medicine. 4.30 P.M., laboratory meeting at the Royal Veterinary College, Camden Town, N.W.
THURSDAY.
Urology. 8.30 P.M., Mr. John Sandrey: Calcification of the Genito-urinary Organs. Mr. G. Y. Feggetter: Anomalous Symptoms in Some Genito-urinary Conditions.
FRIDAY.
Disease in Children. 5 P.M. (Cases at 4.15 P.M.), at the Infants Hospital, Vincent-square, S.W. Dr. Mary Wilmers: Severe Gastro-enteritis. Dr. A. Maitland-Jones: (1) Hemiplegia. Dr. K. H. Tallerman and Mr. David Levi: (2) Duodenal Atresia. Mr. David Levi: (3) Local Gigantism Involving Webbed Fingers. Dr. Charles Harris: (4) Dumb-bell Tumour—Deep X Ray Therapy—Scoliosis. Dr. R. W. B. Ellis: (5) Green Teeth following Icterus Gravis Neonatorum. Dr. A. G. Signy: (6) Graphs showing Response of Red and White Blood Cells to Adrenaline.
Epidemiology and State Medicine. 8.15 P.M., Dr. J. A. H. Brincker and Dr. W. Gunn: The Epidemiology and Prophylaxis of Measles.

MEDICO-LEGAL SOCIETY.
THURSDAY.—8.30 P.M. (26, Portland-place, W.), Dr. Gerald Slot and Mr. B. A. Levinson: The Status, Scope, and Legal Position of the Unqualified Practitioner.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASE.
FRIDAY.—8.30 P.M. (11, Chandos-street, W.), Dr. I. N. Orpwood Price and Dr. T. E. Osmond: Relationship of the Gonococcal Complement-fixation Test to the Diagnosis and Treatment of Gonorrhœa.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Maternity and Child Welfare Group.
FRIDAY.—5.30 P.M., Dr. Ethel Cassie: Children Living Apart from their Parents, including the "Daily Minded."

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, 5, Lisle-street, W.C.
WEDNESDAY.—4.30 P.M., clinical cases. 5 P.M., Dr. W. D. Winnicott: Skin Changes in Relation to Emotional Disturbances.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.
THURSDAY.—5 P.M., Dr. B. E. Schlesinger: The Public Health Aspect of Heart Disease in Childhood. (First Milroy lecture.)

UNIVERSITY OF BIRMINGHAM.
THURSDAY.—4 P.M., Sir Henry Dale, F.R.S.: Transmission by Acetylcholine at Ganglionic Synapses and Nerve-Endings in Voluntary Muscle. (Second William Withering lecture.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Dr. Agnes Savill: National Health in Relation to Artistic Pursuits.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Prof. J. H. Dible: The Pathology of Certain Respiratory Diseases (2). 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Dorothy Russell: Tumours of the Central Nervous System and Meninges.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 2.30 P.M., Mr. L. R. Broster: The Surgical Application of Endocrinology. 3.30 P.M., Dr. A. A. Moncrieff: Feeding of the New-born Infant—Care of the Premature Infant.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

NATIONAL HOSPITAL, Queen-square, W.C.
MONDAY.—3.30 P.M., Mr. G. Elmquist: Demonstration of Remedial Exercises.
TUESDAY.—3.30 P.M., Dr. Grainger Stewart: Spinal Compression.
WEDNESDAY.—3.30 P.M., Dr. F. M. R. Walshe: clinical demonstration.
THURSDAY.—3.30 P.M., Mr. Geoffrey Jefferson: Head Injuries.
FRIDAY.—3.30 P.M., Dr. J. St. C. Elkington: Acute Infectious Disease of the Brain.
Out-patient clinic daily at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. Desmond Curran: psychiatric demonstration.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY.—3 P.M., Prof. F. L. Golla: Epilepsy and the Electro-encephalogram.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. Bertram Shires: X Ray Interpretation in Rickets, Scurvy, Tubercle, Syphilis. 3 P.M., Mr. Denis Browne: Causation of Some Congenital Deformities.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. Harold Kisch: Frontal Sinusitis—Diagnosis and Treatment.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL, N.W.
WEDNESDAY.—4 P.M., Mr. A. Clifford Morson: *Bacillus coli* Infections of the Genito-urinary Organs.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SUNDAY.—INFANTS HOSPITAL, Vincent-square, S.W., all-day course in infants' diseases.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in skin diseases. (Open to non-members.)—F.R.C.S. (PRIMARY) COURSE IN PHYSIOLOGY: Mon., Wed., and Fri. at 5.30 P.M.—LONDON CHEST HOSPITAL, Victoria-park, E. Sat. and Sun., course in diseases of the heart and lungs.—NATIONAL TEMPERANCE HOSPITAL, Hampstead-road, N.W., Tues. and Thurs., 8 P.M., clinical and pathological M.R.C.P. course.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.
THURSDAY.—5 P.M., Dr. A. Burrows: Malignant Conditions of the Skin. (Chesterfield lectures.)

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. B. T. Parsons-Smith: Physical Medicine in Diseases of the Cardio-vascular System.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Mr. J. G. Yates Bell: Pyuria.

MANCHESTER ROYAL INFIRMARY.
FRIDAY.—4.15 P.M., Mr. R. L. Newell: demonstration.

ANCOATS HOSPITAL, MANCHESTER.
THURSDAY.—4.15 P.M., clinical meeting.

LEEDS GENERAL INFIRMARY.
TUESDAY.—3.30 P.M., Dr H. G. Garland: demonstration of neurological cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Royal Hospital for Sick Children), Mr. Matthew White: Surgical Cases.

Vacancies

For further information refer to the advertisement columns

Aberdeen City.—Regional M.O. for Maternity and Child Welfare, £850.
Albert Dock Hosp., Connaught-road, E.—Res. M.O., at rate of £110.
Bath and Wessex Children's Orthopædic Hosp., Combe Park.—H.S., at rate of £120.
Birmingham Children's Hosp.—Res. M.O., £175.
Birmingham City.—Temp. M.O. to Maternity and Child Welfare Dept., £10 per week.
Birmingham, Coleshill Hall.—Deputy Med. Supt., £500.
Birmingham, Maternity Hosp.—Res. M.O. and Reg., £200.
Birmingham, Selly Oak Hosp.—Jun. M.O., at rate of £200.
Bradford, Municipal General Hosp., St. Luke's.—H.P.'s and H.S.'s, each at rate of £150.
Bradford Royal Infirmary.—H.P., at rate of £150.
Braintree, Black Notley Sanatorium.—Jun. Asst. M.O., £250.
Brighton County Borough Mental Hosp., Haywards Heath.—Second Asst. M.O., £500.
Bristol Eye Hosp.—Jun. H.S., at rate of £100.
Cannock Urban District Council.—Asst. M.O.H. and Asst. School M.O., £550.
Carlisle, Cumberland Infirmary.—H.P., two H.S.'s, and H.S. to Spec. Depts., each at rate of £160.
Cassel Hosp. for Functional Nervous Disorders, Swaylands, Penshurst.—Locum Tenens, 8 guineas per week.
Central London Ophthalmic Hosp., Judd-street, W.C.—Sen. and Jun. H.S., £120 and £100 respectively.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Third Res. H.S., at rate of £75.
Charing Cross Hosp., W.C.—Surg. Reg., £150.
Cheadle and Gatley Urban District Council.—M.O.H., £800.
Chesterfield and North Derbyshire Royal Hosp.—Cas. O. and Fracture H.S., at rate of £200.
Clapham Maternity Hosp., S.W.—H.S.
Devonport, Alexandra Maternity Home.—Hon. Consultant.
Doncaster Royal Infirmary.—Fracture H.S., at rate of £200.
Doncaster Royal Infirmary and Dispensary.—Cas. H.S., £175.
Dorset County.—Asst. County M.O. and M.O.H., £800.
Dreadnought Hosp., Greenwich.—H.P. and H.S., each at rate of £110.
***Eastbourne, Royal Eye Hosp.*—H.S., £100.**
Edgware, Redhill County Hosp.—Physician, Grade I, £1000.
Exeter, Royal Devon and Exeter Hosp.—Res. Surg. O., £250. Also two H.S.'s, each at rate of £150.
General Lying-in Hosp., York-road, Lambeth, S.E.—Jun. Res. M.O., &c., at rate of £100.
Glasgow Corporation Mental Hosps.—Jun. Asst. M.O. for Hawkhead Mental Hosp., £300.
Great Yarmouth General Hosp.—H.S., £140.
Grocers Company.—Scholarship, £300.
Guildford, Royal Surrey County Hosp.—Hon. Surgeon and Gynæcologist. Also Hon. Surgeon.
Guildford, Warren-road Hosp.—Res. Asst. M.O., at rate of £250.
Harefield Sanatorium.—Jun. Res. Asst. M.O., at rate of £250.
Hertford County Hosp.—H.S., at rate of £200.
Hosp. for Diseases of the Skin, Blackfriars, S.E.—Clin. Assts. Also Member for Hon. Staff.
Huddersfield County Borough.—Asst. School M.O., £500.
Infants Hosp., Vincent-square, Westminster, S.W.—H.P., at rate of £100.
Isleworth, West Middlesex County Hosp.—Obstet. Surgeon, Grade II, £650. Also Res. Cas. M.O., at rate of £350.
Kingston County Hosp.—Res. Asst. M.O., at rate of £250.
Lancashire County Council.—Asst. County M.O., £800.
Leicester Royal Infirmary.—H.S. and H.P., each at rate of £125. Also Jun. Cas. O., at rate of £100.
Leigh Infirmary, Lancs.—Jun. H.S., at rate of £150.
Liverpool Royal Children's Hosp.—Res. M.O. for Heswall Branch, at rate of £120.
London County Council School Medical Service.—Asst. Aurist, 34*s.* 6*d.* per session.
London Hosp., E.—Physician. Also Asst. Physician.
London Jewish Hosp., Stepney Green, E.—Hon. Clin. Assts.
Maidstone, West Kent General Hosp.—H.S., £175.
Manchester, Ancoats Hosp.—Cas. O., £175.
Manchester, Booth Hall Hosp. for Children.—Asst. M.O., at rate of £200.
Manchester Royal Children's Hosp., Pendlebury.—Two Asst. M.O.'s to Out-patients' Dept., each at rate of £150.
Monmouthshire County Council.—Two Asst. M.O.'s, each £500.
Newcastle General Hosp.—H.S. and Jun. Clin. Asst. to Joint Committee's V.D. Clinic, £250.
Norfolk, Kelling Sanatorium, Holt.—Second Asst. Res. M.O., £350.
Northampton General Hosp.—H.S. to Ear, Nose, and Throat Dept., H.P., three H.S.'s, and two Cas. O.'s, each at rate of £150.
Plymouth City General Hosp.—Asst M.O., £300. Also Jun. Asst. M.O., at rate of £250.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—Res. Anæsthetist and H.S. to Spec. Depts., at rate of £120.
Preston and County of Lancaster Royal Infirmary.—Res. H.S. to Maternity Hospital, and two H.S.'s, each at rate of £150.
Preston, Biddulph Grange Orthopædic Hosp.—Sen. and Jun. H.S.'s, at rate of £250 and £200 respectively.
Preston Hall Sanatorium, near Maidstone.—Asst. M.O., £250.
Prince of Wales's General Hosp., N.—Hon. Med. Reg., £100. Also Jun. H.P. and two Jun. H.S.'s, each at rate of £90.
***Queen Mary's Hosp. for the East End, E.*—Hon. Asst. Obstet. and Gynæcological Surgeon.**
Queen's Hosp. for Children, Hackney-road, E.—H.P. and Ear, Nose, and Throat H.S., each at rate of £100. Also Clin. Asst. to Med. Out-patients, 5*s.* per attendance.
Redhill County Hosp.—Res. Asst. M.O., at rate of £250.
Richmond Royal Hosp., Surrey.—Res. M.O., £200. Also Sen. and Jun. H.S.'s, £150 and £100 respectively.
Royal Cancer Hosp., Fulham-road, S.W.—Second Asst. Pathologist, £250. Also H.S., at rate of £100.
Royal Eye Hosp., St. George's-circus, S.E.—Sen. H.S. and two Asst. H.S.'s, at rate of £150 and £100 respectively. Also Research Assts.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., at rate of £150.
Royal London Ophthalmic Hosp., City-road, E.C.—Two Out-patient Officers, each £100.
Royal National Orthopædic Hosp., 234, Gt. Portland-street, W.—Two H.S.'s, each at rate of £150.
Royal Naval Dental Service.—Dental Officers.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—Pathological Registrar, £200.
Ryde, Royal Isle of Wight County Hosp.—Jun. H.S., £120.
St. Bartholomew's Hosp., E.C.—Res. Asst. Physician-Accoucheur and Demonstrator of Practical Midwifery, £1052 10*s.* Also Dental H.S., at rate of £80.
St. Helens Hosp.—Jun. H.S., £150.
Salisbury General Infirmary.—H.S., at rate of £125.
Salvation Army Mothers' Hosp., Clapton, E.—Jun. Res. M.O., at rate of £80.
Seaton Valley Urban District Council, &c.—M.O.H., &c., £1100.
Stoke-on-Trent, North Staffordshire Infirmary.—H.S. and H.P., each at rate of £150.
Swansea General and Eye Hosp.—Asst. Pathologist, £500.
West London Hosp., Hammersmith, W.—H.P. and H.S., each at rate of £100.
Westminster Hosp., Broad Sanctuary, S.W.—Physician.
Worcester County and City Mental Hosp., Powick.—Asst. M.O., £350.
York County Hosp.—H.P., £150.
The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Almondsbury (Gloucester), Perth (Perth), Killin (Perth), Cullompton (Devon), Thame (Oxon).

CREMATION CONFERENCES.—The National Association of Cemetery and Crematorium Superintendents and the Federation of Cremation Authorities in Great Britain will hold their seventh joint conference at Edinburgh from June 27th to 30th. The first of a new series of annual conferences covering all aspects of cremation administration and propaganda will also be held under their auspices at Balliol College, Oxford, from July 22nd to 25th under the presidency of Lord Horder. The secretary of the conference may be addressed at 47, Nottingham-place, London W.1.

NOTES, COMMENTS, AND ABSTRACTS

AN EIGHTEENTH CENTURY DIARY?

THE reader or reviewer of Knyveton's Diary [1] finds himself in a quandary. Is he to admit the claim of the editor that it represents, with certain stated alterations, an accurate transcription of a diary written in the middle of the eighteenth century by a medical student and naval surgeon; or is he to prefer the statement of the publisher's jacket that Mr. Gray has "reconstructed in diary form" the adventures of John Knyveton? We find it easier to accept the publisher's version. The form of the diary is something too coherent for the day-to-day scribblings of a man of the author's age and period; there are certain episodes, notably the meeting with Dr. Johnson, which fail to carry conviction; and the language, though skilfully contrived to convey an impression of the stated period, at times reveals an acquaintance with modes of thought and expression that are scarcely consonant with mid-eighteenth century usage. We shall therefore assume that the book represents the "reconstructed" adventures of "John Knyveton" in 1751–52; and with this assumption can heartily congratulate Mr. Gray on his achievement in giving us so vivid a tale of adventure nearly 200 years ago.

The story begins with the arrival of Knyveton from the country to pursue his medical education in London at a hospital, "Infirmary Hall," whose name is confessedly altered from its true form, for reasons that seem scarcely sufficient. However, the disguise is not particularly effective, if we are to assume that an actual hospital is named in the original diary. About half the book concerns this student period of Knyveton's life and gives a somewhat gruesome but fairly accurate account of medical studies in the London of the period. It includes stories of grave-robbing; of the conditions in which the patients lived in the wards; of the behaviour and character of his teachers, and of the conduct of the final examination which landed him in his twenty-second year as a surgeon's mate in the navy. The details are not, we think, calculated to arouse the interest or to excite the feelings of the non-medical reader (other than those of incredulity and disgust), but for the student of medical history there is much which will win his attention. The second half of the story is better suited for the general reader. It passes to the adventures of the surgeon's mate in his ship on a voyage to the West Indies, and is a rousing tale of experience and adventure in a period when Great Britain was not actually engaged in war, but when her navy was gradually rising to the conditions of seamanship and discipline which a little later were to triumph in all the oceans. But Knyveton did not lack the experience of a naval fight, for his ship was engaged in a furious and successful battle with a pirate; he underwent the hardships and perils of storm and privation; he had to deal with Yellow Jack, malaria, and other tropical diseases, and after nearly losing his life in what appears to have been an attack of acute malaria—brought on, as he hints, by "a sharp bite from one of those Dam'd Tiger Musketeers"—returned safely to England. He afterwards, according to his editor, served in various ships and in many different parts of the world, and spent altogether nine years in the navy. Then having saved some money he settled in practice in London and was appointed lecturer in midwifery to his old school, "Infirmary Hall." He married, had a family, and prospered in his profession, and died in his eightieth year in 1809.

There is so much circumstantial detail in the different parts of the story that we cannot refuse to believe that John Knyveton or a person to whom that name has been given, lived and kept a journal during these eventful years, but we also are compelled to believe that his diary, as here presented, has been transformed in the process of editing to a shape and substance which the original did not exhibit. However that may be this is a stirring and instructive narrative.

[1] The Diary of a Surgeon in the Year 1751–1752. By John Knyveton, Licentiate of the Society of Apothecaries; Doctor of Medicine of the University of Aberdeen; Teacher of Midwifery to and Man Mid-wife in Infirmary Hall; Surgeon's Mate, H.M.S. *Lancaster*. Edited and transcribed by Ernest Gray. London: D. Appleton-Century Company. Pp. 322. 10*s*. 6*d*.

A BOOT FOR USE WITH PLASTER-OF-PARIS

DR. NORMAN A. VERNON writes: "I have recently designed an inexpensive boot for use over plasters of the leg or foot whereby ambulatory treatment may be carried out without the discomfort and unpleasant appearance of walking on a plaster splint. The boot was made for me by Mr. Stallworthy, bootmaker, of Queensway, Petts Wood, Kent, and consists of a

black canvas upper, sewn to a thick crepe rubber sole (see Figure). The toecap is especially roomy and has a felt pad underneath the toes. In the heel is a detachable shaped cork 'lift' which is designed to fit the foot when the plaster fixes the ankle at a right angle. This boot may be worn during the treatment of many conditions and I have used it with great success in a fracture of the os calcis where the patient's leg and foot were in plaster up to the knee. He was able to attend his business right through the treatment and wore the boot for two months, thus preserving a presentable appearance and saving the plaster from damage and dirt."

A NEW AND A CHANGED CONTEMPORARY

THE ranks of medical journals have been augmented by the *Sphincter*, the organ of the Liverpool Medical Students' Debating Society. The name was, we understand, the best submitted in a competition; the contents are of higher standard. There are illustrated biographies of Dr. J. H. Dible, professor of pathology from 1929 until last year, and of Mr. R. Watson Jones, president of the society, a brief history of the Liverpool Royal Infirmary since its foundation in 1745, instructions on how to be happy though qualified, and a commendable suggestion that the society should discuss successively the various branches of the profession to aid the student in making his choice. The journal is to appear terminally and Liverpool men will welcome it.

The latest medical periodical to change its appearance is the *St. Bartholomew's Hospital Journal*. Old Bart.'s men probably had an initial shock when they saw that the familiar drawing of the Henry VIII gate to the hospital, which has appeared on the cover since the first issue 45 years ago, has been replaced by a bold plaque in modern style, executed by Mr.

Eric Gill—in whose Perpetua fount the page has been lettered. A black-robed monk is represented comforting a pathetic figure vividly portraying pain. The inscription "M. Rahere ✣" may not be clear to those unaware of the prefix Marcus in the name of the hospital's founder. He left Henry I's court to become a canon of the order of St. Augustine, the black friars. The text in future issues of the journal will be in the sturdier Baskerville type. These superficial changes are but the exanthema of a deeper dissatisfaction with the policy as well as the style of former volumes, which has been evident for some time past. The aim is clearly to make the journal more of a student magazine than a serious medical periodical, though the greater part of the circulation—totalling some 2300 copies a month—is among the past rather than the present students. The value of the change depends on whether success is to be measured by popularity within the medical school or by reputation in the wider world of the whole profession. At present the journal is one of the few from the hospitals that appear in the *Quarterly Cumulative Index Medicus*.

MENINGO-ENCEPHALITIS AFTER RUBELLA

THE rarity of encephalitis as a sequel of German measles is shown by the fact that only 12 cases have been reported. Of 11 cases described by Merritt and Koskoff[1] the ages ranged from 5 to 33 years, most of the patients being under 15. Both sexes were equally attacked. The interval between the appearance of the rash and the onset of the nervous symptoms varied between two and six days. With a single exception where it was high the temperature was normal or only slightly raised at the onset of nervous symptoms—6 patients had headache, and nuchal rigidity and Kernig's sign were found in 4. The cerebro-spinal fluid was usually not under increased pressure. The cell count was raised, lymphocytes being predominant. Taylor[2] reports a case—the first in Australia—of a girl aged 18, who developed signs of meningo-encephalitis four days after the first appearance of the rash and died the same evening. The cerebro-spinal fluid was not under increased pressure and was sterile. The cells numbered 130 per c.mm. and were chiefly lymphocytes. The necropsy confirmed the diagnosis of meningo-encephalitis.

SWEDISH EXPERIENCE OF ZINC INSULIN AND ZINC PROTAMINE INSULIN

IN *Nordisk Medicinsk Tidskrift* for Jan. 8th Dr. Uno Carlborg reviews his experiences at Prof. Tillgren's hospital in Stockholm with zinc insulin and zinc protamine insulin. Since the beginning of 1936 some 90 in-patients and a score of out-patients have been treated with zinc insulin—a combination of insulin with zinc acetate, the maximum amount of this salt added to every 40 international units of insulin being 1 mg. Since April, 1937, about 60 in-patients and 20 out-patients have been treated with a Swedish version of zinc protamine insulin. Carlborg confirms earlier claims on behalf of zinc insulin that it has a delayed and prolonged action. The favourable subjective experiences of patients already familiar with the action of plain insulin were confirmed by the comparatively great stability of the blood-sugar curve under treatment with zinc insulin. Manual labourers found it a great advantage that the substitution of plain insulin for zinc insulin enabled them to avoid some at least of the inconveniences of an injection during work hours. For the same reason they found a certain advantage in beginning the day with an injection of zinc insulin at 5.30 A.M. In two cases in which large doses of zinc insulin were given, hypoglycæmic symptoms appeared, and the administration of milk or glucose by injection relieved the hypoglycæmic state only temporarily. In some cases a reaction at the site of injection was complained of when large doses were given, and a couple of patients complained of vague muscular pain and some anorexia after the injections. Apart from these comparatively small drawbacks, the results were considered encouraging. Even more encouraging were the experiences with zinc protamine insulin, whose action was found to last so long that in several cases the former two injections of insulin in the 24 hours could be replaced by a single injection of zinc protamine insulin. In several other cases three injections of plain insulin could be replaced by two injections of zinc protamine insulin. The only ill effects recorded were urticarial rashes, flushing of the face, and occasional swelling at the site of injection a few hours to a week after starting the treatment.

[1] Merritt, H. H., Koskoff, Y. D., *Amer. J. med. Sci.* 1936, **191**, 690.
[2] Taylor, R. J., *Med. J. Aust.* 1937, **2**, 604

FILMS OF SOUTH AFRICA.—Every Friday, between 5.15 and 6.30 P.M., sound films of South Africa, including one in colour, are displayed at South Africa House, Trafalgar-square, London, W.C.2. Tickets may be had from the publicity and travel bureau at that address (Tel.: Whitehall 4488).

VITAMIN-C OUTPUT IN DIET TREATMENT OF RHEUMATOID ARTHRITIS.—We are asked by Dr. E. C. Pillman Williams to state that two references to the work of L. J. Harris and his collaborators are given incorrectly in the paper on this subject by Dr. Dorothy Hare and herself published in our issue of Jan. 1st. In the text of p. 24 the dates referring to Harris's work have been reversed. In the list of references given at the end of the paper the fifth item (Harris, Passmore, and Pagel) should read: Abbasy, M. A., Harris, L. J., and Ellman, P. (1937) *Lancet*, **2**, 181.

GROCERS' COMPANY SCHOLARSHIP.—The Grocers' Company is offering a scholarship for the encouragement of original medical research into the causation of prevalent disease or as to means of preventing premature death. Further particulars will be found in our advertisement columns.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.—The 24th annual conference of this association will be held at B.M.A. House, Tavistock-square, London, W.C., on June 30th, July 1st and 2nd. The annual meeting of the care committees will be held on June 29th.

WORK OF DENTAL MECHANICS.—The British Dental Association, the Incorporated Dental Society, and the Public Dental Service Association have set up a joint committee, under the chairmanship of Mr. R. G. Heegaard Warner, chairman of council of the British Dental Association, to inquire into conditions of service, training, and wages of dental mechanics.

THE SHORTAGE OF NURSES.—The London County Council has decided to appoint an officer to coördinate the efforts of the various departments to secure suitable recruits for the Council's hospital nursing service. A descriptive pamphlet is to be issued, and an assistant superintendent of school nurses is to be seconded to visit schools and other educational establishments so as to make the service better known.

PORT REGIS PREPARATORY SCHOOL.—At this preparatory school two scholarships of £100 each are annually awarded to the sons of medical men. The school is at Broadstairs, Kent, and the scholarships were founded by Sir Milsom Rees. The next examination will be held at the beginning of March. Candidates must be under 9 years of age at the time of competing, and the scholarships are normally tenable till the holder leaves the school. The holders will be selected at an interview in London from among those boys who have done best in some simple examination conducted in or near their homes. Applications must be addressed immediately to the head master, Port Regis School, Broadstairs, from whom full particulars may be obtained.